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THE

NATURAL HISTORY

OF THE

SACRED SCRIPTURES,

AND

Guide to General Zoology;

ILLUSTRATED BY

UPWARDS OF THREE HUNDRED COLOURED ENGRAVINGS,

THE WHOLE ARRANGED AND WRITTEN FROM THE BEST AND MOST MODERN AUTHORITIES,

By W. I. BICKNELL,

LICENTIATE OF THEOLOGY, AND AUTHOR OF "THE ILLUSTRATED LONDON," "THE ILLUSTRATED PARIS," ETC., ETC.

VOL. II.

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THE ROBIN AND NEST.

(Motacilla rubicula.)

Few birds are better known, or more respected by man, than the red-breasts. They live almost under our roofs, becoming more familiar on the approach of severe weather. These birds are so seldom disturbed by the hand of man, that but for the cats, and other such grimalkins, they would become much more common than they are.

A short description will suffice. The bill is slender and delicate, though hard; the eye large and black; the head and back a greenish-brown; the neck and breast of a deep reddish-orange, with a spot of the same colour on the forehead; the belly, and underparts a dull white; the legs are dusky.

The domed nest of this pretty warbler is placed near the ground in woods and thickets, being constructed of moss, intermixed with hair and dried leaves, and lined with feathers or down. The lady-robin lays from five to nine eggs, of a dull white, spotted with red. The male bird, during the time of incubation, evinces a strong development of affection and jealousy. He stations himself at no great distance from the nest, where he fills up his

unemployed intervals in serenading his beloved bride; but occupying himself chiefly in providing food for his imprisoned fair, and sedulously driving away all the birds of his own species from his little settlement. Two pairs of these birds have never been known to build in the same bush, at the same time, being as jealous as they are faithful.

The favourite food of the robin is insects and worms; but they are never eaten while alive. Having caught its prey with its bill, the bird beats it against the ground, till it ceases to move.

The robin is a true Briton, never leaving his native country. He does indeed perform a partial migration during the season of love, and while engaged in the care of bringing up a family; but when the young are able to provide for themselves, he leaves his retirement, and once more approaches the habitation of man, with his accustomed familiarity.

Young robins, even when full-feathered, may easily be taken for some other bird, being spotted all over with a rust-colour on a light ground; nor do they obtain their proper plumage till the month of September. Redbreasts are never seen in flocks. Even the young birds, having attained their full colour, and about to leave their birth-place, do so singly.

The branch of the tree on which the robin's nest appears is the *Canella* (CINNAMOMUM ZEYLANICUM), a small tree about the height of the willow, the inward bark of which is cinnamon, so often noticed in Scripture, being one of the ingredients which was directed to be employed in the composition of the holy anointing oil. Exodus, xxx. 23.

NIGHTINGALE AND REDSTART.

THE REDSTART.

(Motacilla phœnicurus.)

This is one of our prettiest warblers, arriving amongst us in April, and leaving about October. Its bill and eyes are black; its forehead white; its cheeks, throat, fore-part, and sides of the neck are black, which colour extends over each eye; the crown of the head, the hinder part of the neck, and the back, are of a deep blue-grey; the breast, rump, sides, and tail, are a fine red; the bill is white; and the feet and claws black: the female loses much of that brightness of colour which distinguishes the male.

Its haunts are old walls and ruinous edifices, where it makes its mossy nest, lined with hair and feathers. It is known by a peculiar quick shake of the tail from side to side, when it alights. Though a shy bird, it is often to be seen in the midst of a populous town, but always choosing difficult and inaccessible places for its residence.

The female lays four or five eggs, not unlike those of the hedge-sparrow. The peculiar manner in which birds choose their mates is not easy to determine. But in the event of death, by disease or accident, the survivor, whether male or female, appears to find no difficulty in procuring another partner. A widowed male bird, having a nest with eggs, has been noticed going out in the morning in search of a mate, and returning with another female in the afternoon, and who proceeded forthwith, to the duty of incubation.

THE NIGHTINGALE.

(Motacilla luscinia.)

This extraordinary vocalist has but few pretensions to beauty of plumage; on the contrary, its appearance scarcely varies from that of the smaller thrushes. The general plumage above is reddish-brown, white beneath; the tail is long, and of a brownish-red; the third and fifth wing-feathers being of equal length. Its length is about six inches.

The nightingale, or night-singer, is a migratory bird, visiting Great Britain in the middle of April, and leaving us in August, or September, it is thought, for Egypt and Syria. The male birds always arrive first, in flocks, and are instantly sought after by the bird-catchers, who generally avail themselves of this short interval which precedes the coming of the females, since those males which are captured after having paired seldom survive. Bird-fanciers have a notion, that Surrey nightingales surpass all others in richness and variety of song.

The song of this bird has employed the pens of poets in all ages; some describing it as most melancholy, others as most joyous; all, however, uniting in pronouncing its song most brilliant and comprehensive. "Notes," observes the honourable Daines Barrington, "are no more innate in birds, than language is in man, and depend entirely upon the master under whom they are bred, as far as their organs enable them to imitate the sounds which they have frequent opportunities of hearing." This remark, however, must be understood with considerable limitation.

The same writer adds, that birds in a wild state, do not commonly sing above ten weeks in a year; while caged birds sing, perhaps, for nine or ten months. The singing of the male bird during the time of incubation, is not intended, the same writer thinks, to please his mate, so much as to rival some other bird, or contend against any sort of continued noise. The song of birds, continues our author, is rarely reducible to musical notations; first, because its rapidity is often very great, and so uncertain when it will stop, that the notes cannot be reduced to a musical bar, in any time whatsoever; and secondly, because the pitch of most birds is higher than that of any instrument. Dr. Wollaston thinks "that the chirp of the sparrow is about four octaves above E, in the middle of the pianoforte." Mr. Barrington farther conjectures, that all birds of the same species sing in the same key; and from an experienced harpsichord-tuner, who had paid great attention to the subject, he learnt, that wood-larks sing in the key of F; common cocks in A; bantam-cocks in C, falling to A; and thrushes in A. Whether this is correct we leave to the judgment of our readers; as to ourselves we believe that no bird whatever, either sings in a minor key, or even modulates into that key, the minor strain being a peculiarity of the human voice. We give this as an opinion, but one on which we would not be too positive.

Almost all agree that vocal precedence must be assigned to the nightingale, not only on account of its tone and variety, but also because it sings with superior judgment and taste. We subjoin a curious table of the comparative merit of British singing-

birds, twenty being the assigned point of absolute perfection.

Name of Bird.	Mellowness of tone.	Sprightly notes.	Plaintive notes.	Compass.	Execution.
Nightingale . . .	19	14	19	19	19
Skylark	4	19	4	18	18
Woodlark	18	4	17	12	8
Linnet.	12	16	12	16	18
Goldfinch	4	19	4	12	12
Hedge Sparrow.	6	0	6	4	4
Thrush.	4	4	4	4	4
Blackbird	4	4	0	2	2
Robin	6	16	12	12	12
Wren	0	12	0	4	4

The nightingale, it is asserted, expresses his different feelings by suitable and particular tones. The most unmeaning cry, when he is alone, appears to be a simple whistle, the sound of which is like *fitt*, but if *crr* be added, it is the call of the male to the female. The sign of displeasure or fear is *fitt*, repeated rapidly and loudly before adding *crr;* while that of pleasure and satisfaction is a deep *tack*, which may be imitated by smacking the tongue. This bird, according to Bechstein, a modern writer on cage-birds, has twenty-four different strains or couplets, without including its delicate little variations; for among nightingales, as among other musicians, there are some great performers, and others far inferior. "This song," he avers, "is so articulate, that it may well be written. The following is a trial which I have made as that of a nightingale in my neighbourhood, which passes for a very capital singer."

We copy this trial for the information of our readers, without at all pledging ourselves for its accuracy Of that every reader must judge for himself.

" Tioû, tioû, tioû, tioû.
Spe, tiou squa.
Tiô, tiô, tiô, tiô, tiô, tiô, tiô, tix.
Coutio, coutio, coutio, coutio.
Squô, squô, squô, squô.
Tzu, tzu, tzu, tzu, tzu, tzu, tzu, tzu, tzu, tzi.
Corror, tiou, squa pipiqui.
Zozozozozozozozozozozozo, zirrhading!
Tsissisi, tsissisisisisisisis.
Dzorre, dzorre, dzorre, dzorre, hi.
Tzatu, tzatu, tzatu, tzatu, tzatu, tzatu, tzatu, tzatu, dzi.
Dlo, dlo, dlo, dlo, dlo, dlo, dlo, dlo, dlo.
Quio, tr, rrrrrrrr, itz.
Lu, lu, iu, lu, ly, ly, ly, ly, liê, liê, liê, liê.
Quio, didl li lulylie.
Hagurr, gurr, quipio!
Coui, coui, coui, coui, qui, qui, qui, qui, gai, gui, gui, gui.
Goll goll goll goll guia hadadoi
Couigui, horr, ha diadia dill si!
Hezezezezezezezezezezezezezezezeze couar ho dze hoi.
Quia, quia, quia, quia, quia, quia, quia, quia, quia, ti.
Ki, ki, ki, ïo, ïo, ïo, ioioioio ki.
Lu ly li le lai la leu lo, didl ïo quia.
Kigaigaigaigaigaigaigai guiagaigaigai couior dzio dzio pi."

Gossiping Izaak Walton well observes, "He that at midnight, when the weary traveller sleeps securely, should hear, as I have often done, the clear airs, the sweet descants, the natural rising and falling, the doubling and redoubling of the nightingale's voice, might well be lifted above earth, and say, 'Lord, what music hast thou provided for the saints in heaven, when thou affordest bad men such music on earth!'"

The nightingale, in the choice of a locality, appears very capricious, though impelled therein by laws which we cannot explore. It visits most parts of Europe, the more temperate parts of Russia, Siberia, and Sweden not excepted; yet in North Wales it is never seen, or in any of the English counties north of it, except Yorkshire, where, in the neighbourhood of Doncaster, it abounds. It has also been heard, but rarely, in the vicinity of Shrewsbury. It is remarkable that this bird does not migrate so far west as Devonshire and Cornwall, counties where the seasons are so very mild. Neither has it ever been seen either in Ireland or Scotland, or indeed north of the Tweed. These peculiarities admit of no rational explanation. The following attempt to establish the nightingale in Scotland is too curious to be omitted. It has long been a prevailing opinion, that these migratory songsters, old and young, return to their native haunts in the breeding season. Impressed with this belief, Sir John Sinclair, bart., procured from London, as many nightingale's eggs as he could purchase at a shilling each. Several men were then employed to find, and take care of several robin-nests, in places where the eggs might be deposited and hatched in security. The robins' eggs were removed, and replaced by those of the nightingale, which were sat upon, hatched in due time, and the young brought up by the foster-parents. The songsters flew when fully fledged, and were observed for some time afterwards near the places where they were hatched; but at the usual migratory season, they disappeared, and to the disappointment of the experimenter, and for reasons which cannot

be explained, not one of them ever returned to the place of its birth.

Nightingales, during the season of incubation, are very solitary birds, abiding in the thickest coverts, especially near a public road, where their nests are constructed in a low bush, and often on the ground. The nest is made principally of withered leaves, and without a display of much architectural skill. The eggs are olive-brown, and four or five in number. The young are generally hatched in June, when the melodious song of the male ceases, and is succeeded by a low croak. Indeed, the brilliancy of his note declines when the season of love is over, and the work of incubation has fairly begun.

The food of the nightingale consists of flies, spiders, moths, and earwigs, but the young are more generally fed with green caterpillars. It is likely that the birds in the choice of a locality, are in some measure, determined by the absence or presence of some favourite insect-food.

Nightingales are not difficult to rear in captivity, provided they are taken young, or, if adults, before the season of love commences. Mr. Syme remarks, that in 1802, being at a friend's house about three miles from Geneva, on a beautiful still evening, and within hearing of the murmur of the Rhone, he heard two nightingales sing most delightfully; but not more so than one which he heard down stairs in a dark cellar, in the High-street, in Edinburgh—such a place as that described in the *Antiquary;* no window, and no light admitted, but what came from the open door, and the atmosphere charged with the fumes of tobacco and spirits; it was a place

where carriers lodged, or put up, and the heads of the porters and carriers, carrying luggage, nearly came in contact with the cage, which was hung at the foot of the staircase; yet even here, did this bird sing as sweetly, and sprightly, as those at Geneva. We will only farther intrude upon our reader's patience by giving a quotation from Coleridge, to determine whether the nightingale should be considered a melancholy or a merry bird:—

"A melancholy bird? Oh! idle thought—
In nature there is nothing melancholy,
But some night-wandering man, whose heart was pierced
With the remembrance of a grieving wrong,
Or slow distemper, or neglected love,
(And so, poor wretch, fill'd all things with himself,
And made all gentle sounds tell back the tale
Of his own sorrow,) he, and such as he,
First named these notes a melancholy strain,
And many a poet echoes the conceit.
———————— We have learnt
A different tone: we may not thus profane
Nature's sweet voices, always full of love
And joyance! 'Tis the merry nightingale
That crowds, and hurries, and precipitates
With fast thick warble, his delicious notes,
As he were fearful that an April night
Would be too short for him to utter forth
His love-chaunt, and disburthen his full soul
Of all its music!———— ————————
———————— Far and near
In wood and thicket, over the wide grove
They answer and provoke each other's songs,
With skirmish and capricious passagings,
And murmurs musical, and swift, jug, jug,
And one low piping sound more sweet than all,
Stirring the air with such a harmony,
That should you close your eyes you might almost
Forget it was not day."

WREN AND NEST.

THE WREN AND NEST.

(Motacilla troglodytes.)

This is one of the smallest, and most interesting, of our warblers, being the only species of a very numerous family, that permanently abides amongst us. Living almost under our roof, and craving its winter's supply from the cottager's table, no hand is uplifted against it during the summer months, excepting that of the unbirched truant, or the lawless caitiff.

The upper parts of this bird are reddish-brown, marked with narrow transverse stripes; the quill-feathers are varied with alternate spots of black and brown; the tail coverts and feathers striped with black; the throat and breast a greyish-white. The length scarcely four inches; the female rather less than the male, and the colours somewhat less bright.

The wren is seldom seen on the wing, or known to fly over a hedge, but creeps about the hedges, entering at the lower part, and working its way upwards. Like the robin, its pretty simple notes may be heard amidst the snow of mid-winter; though frost and snow are sometimes too much for it, and the little creature, though tolerably hardy, perishes in consequence. To avoid this, it often seeks a retreat in warm cattle-sheds, and other sheltered places.

The nest of this songster is usually made on, or near the ground, with hay, moss, wool, or other materials, according to circumstances. It is rather an ambitious architect, making a very large domicile,

as compared with the size of the bird. The nest is usually of an oval shape, the top being in the form of a dome, and the entrance by a small hole at the side. The female will lay seven, ten, or even more, eggs, which are white, with a few reddish spots. Ten days suffice for hatching the brood: sixteen young ones have been found in one nest; a large family for such diminutive parents to rear. Persevering industry, however, does much; and since the male bird, during the period of incubation, has plentifully supplied his mate with food, it is but to increase his assiduity, especially when assisted by the maternal energy of the hen-bird, to keep the youngsters well supplied with insects and worms, their accustomed food.

According to ancient fables, the wren was the antagonist of the mighty eagle, the attendant bird of Jupiter. There is, however, reason to know that *kitty-wren*, as this bird in some localities is called, moves in too humble a sphere to attract the notice of the bird of heaven; so that though the wren is ever ready to show fight to an intruding compeer, its ambition does not ever extend to a desire of entering *the ring* with the imperial eagle.

Although this bird is the only one of the wrens which permanently resides amongst us, yet are there others of this numerous, and widely-scattered family, as the willow-wren, the golden-crested wren, and others, which become our occasional visitors.

The flower seen in connexion with the wren's nest is the rose of Sharon (CISTUS ROSEUS), which is mentioned in the book of Canticles, chap. ii., 1. These

flowers, though single, are very beautiful, being red, red and yellow, and red and white; the three colours not unfrequently being seen on the same tree. They are natives of the east, and are much employed for festal chaplets. In the apocryphal book of Wisdom, sensualists are represented as saying, "Let us fill ourselves with costly wine and ointments, and let no flower of the spring pass by us; let us crown ourselves with rose-buds before they are withered." Chap. ii. 7, 8.

THE BLACK-CAP WARBLER.

(Sylvia atricapilla.)

The orbits of the eyes of this warbler are covered with feathers; the head of a deep black in the male, in the female reddish; the upper parts of the body ash-coloured; belly and throat whitish; bill and legs black. Length about five-and-a-half inches.

This splendid songster, often called the mock-nightingale, visits us about the middle of April, retiring in September. Its singing is light and easy, consisting of a succession of modulations, which are sweet, flexible, and compact. It is ever in motion, which makes its song somewhat desultory; but when the bird sits calmly, and engages in song with earnestness, it pours forth a melody consisting of very sweet notes, with gentle modulations. It by common consent gives place to none of our warblers, the nightingale only excepted. Its throat is wonderfully distended during its warblings.

Being a lover of fruit, gardens are its more frequent places of resort, where also, near to the ground, it commonly makes its nest, composed of dried grass, or moss, and lined with softer materials. The eggs are usually five in number, of a pale reddish-brown, sprinkled with darker spots. The male takes his turn in the work of incubation, although the brunt of the work falls, pretty much, upon the female. The male, however, is always near at hand, and occasionally treats his mate with a fly, a worm, or other tit-bits.

THE PIED WAGTAIL.

(Motacilla alba.)

The wagtails, or washers, are chiefly confined to the continent of Europe, where they are everywhere to be found in considerable numbers, excepting in very high latitudes. With us these birds are not migratory, although on the approach of winter, they change their quarters from north to south.

The pied wagtail, known by every child living in the country, as the water-wagtail, or dishwasher, from their brisk and lively motions, jerking their long tails incessantly up and down, living on the edge of shallow pools and puddles. They never hop, but run nimbly along the ground in search of their prey; flies, and other insects. They may often be seen following the ploughman in order to pick up the smaller worms, which may chance to be turned up by the plough. They are likewise constant

WAGTAIL AND BLACKCAP.

attendants upon flocks, to catch the numerous flies which are perpetually annoying sheep.

This bird is about seven inches in length; its bill black; the eyes hazel; the hinder part of the head and neck black; the forehead, cheeks, and sides of the neck, white; the remaining colours black and white; the legs are black. The female slightly differs from the male, having the head brown.

Their nest is built on the ground, without much art; the female usually laying five eggs, which are white, spotted with brown. The parent birds are most devoted to their young. On the approach of danger they will endeavour to draw aside the enemy by various little arts; or in cases of actual attack, will defend their brood with unshaken courage. It is even said, that in the event of their finding pieces of paper, or other objects, which by possibility may have been placed there to mark the nest, that such substances will be carefully and promptly removed.

THE WHITE-THROAT.

(Motacilla sylva.)

The white-throat, or muggy, is a pretty bird, but an inferior singer. Arriving in this country in the spring, it mingles its *cha, cha, cha* with other songsters; and thus, though humbly, contributes to the harmony of the grove.

This bird may always be distinguished by its white appearance. Its bill is brown; the eyes hazel; the

head, back, and tail of a reddish-ash colour; its breast and belly silvery white, even more so in the female than the male. Its length from five to five-and-a-half inches.

It makes its nest in thick bushes with fine dried grass, thinly lined with hair; the female laying five eggs, of a greenish-white, sprinkled with dark olive spots.

The food of these birds consists chiefly of insects and wild berries.

In the autumn of the year, having reared their young, they retire from us, spending the winter months elsewhere.

THE WHEAT-EAR.

(Motacilla œnanthe.)

This is a very handsome, and elegantly-shaped bird, the size of that just described, but no songster. It is merely a visitor with us, arriving from about the middle of March, until the same time in May: it leaves in August, or September.

Its bill is black; eyes hazel; from the base of the bill a black streak is extended over the eyes, and cheeks, where it becomes much broader; above this is white, but the top of the head, part of the neck and the back, are bluish-grey; the rump and part of the tail are snowy white; the under-parts are a pale buff, with a tinge of red on the breast; the legs and feet black. In the female the colours are less fully developed.

The wheat-ear, or white-rump, as it is often called, builds a neat nest under shelter of a tuft of grass or clod, often in newly ploughed lands. The nest is composed chiefly of moss, mixed with wool, and lined with feathers; as a farther defence, it is protected by a sort of covert. The eggs are five or six in number, of a light blue colour.

It feeds on insects and small worms, often following close to the tail of the plough in search of the latter.

Great numbers of these birds are, during the season, sent to the London markets, being much esteemed, and thought but little inferior to the ortolan.

Their habitat is extensive, being spread over nearly the whole surface of the old world.

THE FIELD-LARK.

(Alauda trivialis.)

We now come to the last family of the bill-toothed birds which we can notice; the field-lark being justly ranked among the choicest of our warblers.

The bill is slender and dusky; the upper parts of the body of a greenish-brown; the under-parts yellowish-white, speckled on the breast and neck; the legs pale brown; the hinder claw is shorter and more crooked than in the skylark, which is plainly indicative of its kind.

The field-lark builds its nest on the ground, in solitary spots, or conceals it beneath a turf; the female lays about five eggs of a brownish colour.

Its song is full, clear, and melodious, often accompanied with considerable motion, the bird widely opening its mouth and quavering with its wings. In the winter the voice degenerates into a mere cry, resembling that of a grasshopper, though stronger and shriller; hence it is known as the *pipit*, or chirping lark.

THE WOOD LARK.

(Alauda arborea.)

This bird is somewhat larger than that just described, the colour of its plumage being the same.

Its nest is constructed on the ground, but without much architectural skill, and of coarse materials. Five eggs are more generally laid, of a dusky hue, marked with brown spots.

For brilliancy of tones, the singing of this bird ranks very high. Perched on a tree it makes the woods resound with its loud and clear warblings. It rivals the nightingale for its nocturnal serenading, and may well be mistaken for that prince of song. It will often sing, like the skylark, when on the wing.

These birds, in common with other larks, are decidedly unsocial during the summer months, their nests rarely being found near to each other. They are not quarrelsome and pugnacious, like the redbreasts, yet they prefer a secluded spot. No sooner is the breeding season fully over than they flock together in incredible numbers, and are caught for the table, being then fat.

THE SWIFT.

(Hirundo apus.)

THE cleft-billed birds present no very great variety, being confined chiefly to the swallows and the goat-suckers. Of these birds generally it may be said that their bills are very short, much depressed, and very wide at the base, the upper mandible curved at the point, legs short, with slender toes and claws; three toes before, one behind, nearly of the same length; wings long, the first quill the longest; tail of ten or twelve feathers, mostly forked.

The swallow-tribe manifest a predilection to the neighbourhood of water, and those situations in which insects most abound. These they seize with great promptitude in their long-sustained and very rapid flight. They catch their food, drink, and bathe as they glide smoothly and nimbly along the surface of the water. Their motions are easy, swift, and graceful; and when not in their nest or asleep, are almost incessantly on the wing. Their nests, for the most part, are hard and rough on the outside, but soft within. Their migrations are no longer a matter of doubt.

The swift is the largest of the swallow family, being about eight inches long. Its bill is black; the eyes hazel; its general colour a sooty-black with a greenish shade; the legs are dark brown and very short; the toes are arranged two and two together, which is a conformation peculiar to this bird. The

female differs but little from the male, though somewhat smaller.

These birds are singularly inoffensive, harmless, and social, attaching themselves to our houses or their immediate vicinity. Their note is rather whistling than singing, and that always on the wing.

They commonly arrive earlier, and leave sooner than any of their tribe, rearing their brood by about June. They are believed to remove to very great distances, having been seen at the Cape of Good Hope, and the more remote regions of Asia. Few birds are so rapid in flight, the wings being very strong, and more than twice the length, from tip to tip, of their entire body. They are seldom to be seen during the heat of the day; but in the evening they flit along with great rapidity, and always in company. It is also remarkable, that they rarely alight on the ground; but if by any accident they do so, there appears great difficulty in recovering themselves.

Their nests are usually built in elevated places, lofty steeples, or high towers; under the arches of a bridge is also a favourite locality, which though not high is very difficult of access. The nest is made of soft materials, never of earth or clay. The female lays five white eggs.

Early in July the swifts begin to assemble in great numbers; they soar higher in the air than usual, and their cries become shriller. These meetings continue to increase with augmented numbers, until towards the middle of August, when, without pilot or compass, they all disappear.

ESCULENT SWALLOW AND NEST.

THE MARTIN, OR WINDOW SWALLOW AND NEST

IN HEB. *Deror.*—(Hirundo urbica..)—IN ENG. *The Free-one.*

"*Yea, the sparrow hath found a house, and the* SWALLOW *a nest for herself, where she may lay her young, even thine altars, O Lord of hosts, my king, and my God.*"—PSALM lxxxiv., 3.

DOCTOR T. M. HARRIS, in his *Natural History of the Bible,* following the Septuagint, the Vulgate, Bochart, and Leclerc, gives it as his opinion, that the word in the above text, translated swallow, rather refers to the turtle-dove, or some kind of pigeon; but, for ourselves, we prefer the rendering of our authorised version of the Bible, supported as it is by Montanus, Pagninus, the French version of Geneva, and Stock. But without troubling our readers with any critical remarks, we think it much more natural that a bird like the swallow should be intended, since it always seeks the neighbourhood of man's residence for building its nest, than to any species of the wild pigeon, which never has any such propensity. The word *deror* itself, involving the idea of liberty, or freedom, cannot with any propriety be referred to any bird like the dove or tame pigeon, already in a state of captivity. We conclude then, that some branch of the swallow family, known in Palestine, must be the bird mentioned in the above-quoted passage of Scripture.

The head, neck, and top of the back of the window-swallow are black, with violet reflections; the wings, tail, and larger coverts black; the tail forked;

the lower parts and rump white; the *tarsus* and toes covered with downy feathers. The length of this bird is about five inches.

The first appearance of these pretty and familiar visitors is about the middle of April, and they remain with us longer than any others of their tribe, often not leaving till towards the beginning of November. They return, from year to year, to the same spot, a fact which has been repeatedly ascertained by a coloured thread having been secured around their legs, or some other distinguishing mark.

One long quotation from the entertaining work of White, of Selborne, will comprise all that we need farther say. "A few house-martins," says this writer, "begin to appear about the 16th of April, usually some few days later than the swallow. For some time after their arrival they pay no attention to the business of nidification, but play and sport about, either to recruit from the fatigue of their journey, or that their blood may recover its true tone and texture, after it has been benumbed by the severities of winter. About the middle of May, if the weather be fine, the martin begins to think in earnest of providing a mansion for its family. The crust or shell of the nest seems to be formed of such dirt or loam as comes most readily to hand, and is tempered and wrought together with little bits of broken straws, to render it tough and tenacious. As this bird often builds against a perpendicular wall, without any protecting ledge under, it requires its utmost efforts to get the first foundation firmly fixed, so that it may safely carry the superstructure. On this occasion the bird not only clings with its claws,

but partly supports itself by strongly inclining its tail against the wall, making that a fulcrum; and thus steadied, it works and plasters the materials into the face of the brick or stone. But then that this work may not, while it is soft and green, pull itself down by its own weight, the provident architects have prudence and forbearance enough not to advance the work too fast, but by building only in the morning, and dedicating the rest of the day to food and amusement, give it sufficient time to dry and harden. About half-an-inch seems to be a sufficient layer for a day. Thus careful workmen, when they build mud-walls (informed at first, perhaps, by this little bird), raise but a moderate layer at a time, and then desist, lest the work should become top-heavy, and so be ruined by its own weight. By this method, in about ten or twelve days is formed an hemispheric nest, with a small aperture towards the top, strong, compact, and warm, and perfectly fitted for all the purposes for which it was intended. These industrious artificers are at their labours, in the long days, before four in the morning; when they fix their materials they plaster them on with their chins, moving their heads with a quick vibratory motion. It has been observed that martins usually build to a north-east or north-west aspect, that the heat of the sun may not crack and destroy their nests; but instances are also remembered where they bred for many years in a hot stifled inn-yard against a wall facing the south. Birds, in general, are wise in their choice of situation; but in this neighbourhood is seen a strong proof to the contrary, at a house without eaves in an exposed dis-

trict, where some martins build, year by year, in the corners of the windows. But, as the corners of these windows (which face the south-east and south-west), are too shallow, the nests are washed down every hard rain, and yet these birds drudge on to no purpose from summer to summer, without changing their aspect or house. It is a piteous sight to see them labouring when half their nest is washed away, and bringing dirt—

——"'Generis lapsi sarcire ruinas.'

Thus is instinct a wonderfully unequal faculty; in some instances so much above reason, in other respects so far below it."

Our engraving represents part of the front of a cottage on Herne-hill, the property of Elhanan Bicknell, Esq., as it appeared on the morning of the 21st of May, 1833. Sketched on the spot.

THE ESCULENT SWALLOW AND NEST.

(Hirundo esculenta.)

This singular variety of the swallow family is much smaller than the martin just described. It is a chesnut-brown colour above, and whitish beneath. The end of the tail is also white.

The esculent swallow is found on the coast of China, in Java, and in the Indian Archipelago, and is chiefly distinguished for the formation of nests, which are edible, and, indeed, highly prized by Chinese and other epicures. There are, doubtless, sev-

eral kinds of this bird, but that which is most highly esteemed is a small species, little more than half the size of our common window swallow. They are gregarious, living chiefly in caverns by the sea-side, or, at least, at no great distance from the sea. These nests are, it is believed, chiefly formed of a peculiar scum, being probably the spawn of some fish, which, at a particular season of the year, is found in eastern seas, and in considerable quantities. This, mingled with a saliva which is emitted by a certain glandular organization within the bird, constitutes the singular substance of which the nests are formed. The whiter, or more valuable nests, are taken before they become soiled, either by the work of incubation, or the dirt of a young brood. The best sort is worth £5 18*s.* 1½*d.* the pound; the whole quantity sent from Batavia amounting annually to 242,400 lbs., worth £284,290 sterling. This large amount is the exclusive property of the sovereign, and everywhere forms a valuable branch of his income.

A number of these nests, of various qualities, may now (1851) be seen in the Great Exhibition, Hyde Park, under the head Indian Archipelago; also in the British Museum.

THE NIGHT-JAR, OR GOAT-SUCKER.

(Caprimulgus Europœus.)

THE NIGHT-JARS constitute the second, and only remaining class of cleft-billed birds. They are but

visitors with us, coming late in the spring, and retiring late in the autumn. These birds have received the name of goat-suckers from a tradition, that they are in the practice of sucking goats, to which has been farther added, that the teat which they suck produces a disease in the animal which terminates in blindness. This tradition may be placed in the category of old-wives' fables, together with that alleged against cats, of sucking the breath of infant children. Both are alike false and absurd.

The night-jar is a little more than ten inches long; its bill being small, flat, and somewhat hooked at the tip, the gape being very large; it is also furnished on each of the upper mandibles with several strong bristles, whereby it secures its prey; the eyes are large, full, and black; the plumage beautifully freckled and powdered with brown of various hues, mixed with singularly diversified markings of rufous and white. The legs are short, rough, and feeble, and are occasionally used in securing its prey, which it more usually takes when on the wing: they are also feathered below the knee.

These birds, in many respects, resemble the owls, never appearing until the dusk of the evening in search of their prey. While on the wing they make a singular buzzing noise, often compared to the noise caused by the quick rotation of a spinning-wheel. When at rest, perched on a tree, they make a continued jarring noise, which has given rise to the name by which they are distinguished. They feed chiefly on insects and nocturnal moths; cock-chafers, or dor-beetles, are likewise destroyed in great numbers by these birds of night.

The more frequent retreats of the night-jars are moors and wild heathy tracks abounding with fern. They make no nests, the female depositing her eggs on the ground, usually two or three in number; they are of a dull colour, spotted with white.

They never, by any chance, congregate together, being so solitary that even two are seldom seen close to each other, but sitting at a little distance apart.

Night-jars are to be found in every part of the old continent, from Siberia to Greece, Africa, and India. Varieties of the same family are widely scattered over North America and Australia.

THE AUSTRALIAN GOAT-SUCKER.

(Podargus humeralis.)

This variety is much more handsome than its compeer of Europe just described. The bill is large and strong, the upper mandible not furnished with bristles. The colour, on the whole, greatly resembling the European family, being variegated above with ashy-brown and dirty yellow; the head and sides of the back are striped with black; the forehead and dorsal plumage dotted and banded with white; it is spotted beneath with black and dull yellow. The entire length of the bird about 28 inches.

Of their particular habits but little is known; yet it is believed that they do not essentially differ from those of Europe.

Their habitat is Australia.

THE SKY-LARK AND NEST.

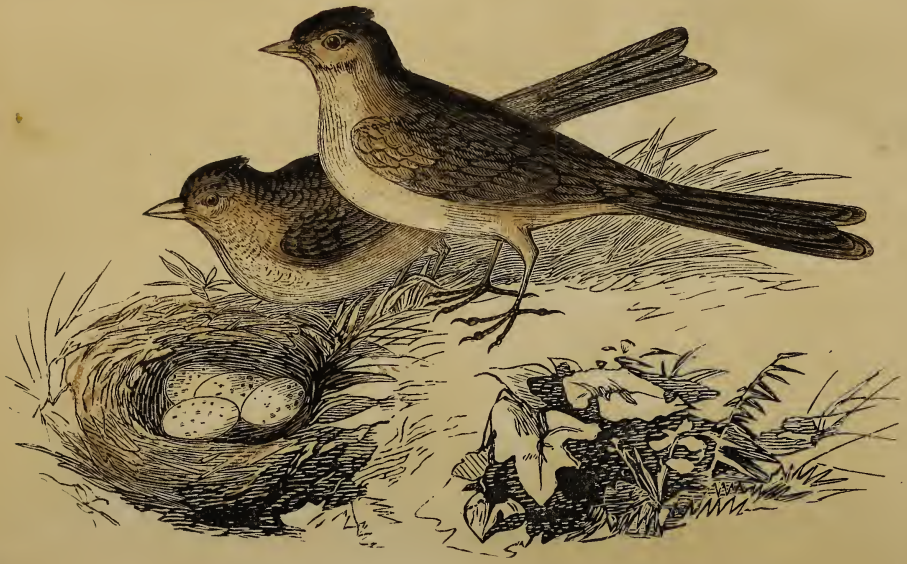
(Alauda arvensis.)

THE third division of passerine birds is distinguished by short conical bills, with the mandibles of equal length, the upper one slightly convex; the nostrils lateral, and partly concealed by reflected feathers; claw of the tarsus or hind toe very long, and nearly straight; coronal feathers long, and capable of erection, especially in male birds. This entire genus all inhabit open field or plains.

The upper parts of the sky-lark are reddish-grey, each feather blackish in the middle; a whitish band is above the eyes; the throat white; neck, breast, and flanks tinted with a reddish hue; the tail brown, the outer feather white. The length about six inches.

The lark is one of our choicest songsters, beginning to sing very early in the spring, being heard chiefly in the morning. It rises in the air almost perpendicularly, and by successive springs hovering at a vast height; its descent, on the contrary, is in an oblique direction, unless it is threatened by birds of prey, or attracted by its mate, and on these occasions it drops like a stone. It never sings (excepting in captivity) but when on the wing, and then chiefly in rising. Its notes are loud and clear.

These birds make their nests on the ground, lining them with dried grass and roots, but without much architectural skill. The female lays four or five eggs, of a greyish-brown colour, marked with darker spots,



SKYLARKS AND NEST.

she generally has two broods in a year, and sits about fifteen days. The care of the parent birds seems to increase the moment their young have left the shell, fluttering over their heads, directing all their motions, and ever ready to screen them from every danger.

Skylarks are widely diffused throughout Europe. They are everywhere extremly prolific, and the prodigious numbers which are frequently caught are truly astonishing. The neighbourhood of Dunstable is famous for the great number of these birds found there; four thousand dozen have been caught in this locality between September and February for the London markets. No sooner is the work of incubation finished than they become gregarious, being constantly on the ground feeding, and in immense flocks. During the winter months they are always fat.

GREAT TITMOUSE.—BLUE TITMOUSE.

(Parus major.) (Parus cæruleus.)

If other countries can boast of the magnificent plumage of their birds, it may be said, that Great Britain is by no means wanting either in the number or variety of its song-birds. At the earliest approach of spring our woods and groves lose their silence, the numerous warblers making these retreats to resound with their melody. The large but comparatively diminutive family of the titmice, are all, almost without an exception, singers; although the

strain of some of them is but short. The whole family is characterised by a short, straight, strong, conical, and compressed bill, with small hairs at its base; the nostrils rounded, but much concealed by projecting feathers; the legs are stout; the toes divided to their origin, but the hinder one the strongest and most bent.

Small in size, they are notwithstanding very active, being constantly in motion; their courage is so great, that they almost vie with the butcher-birds for their pugnacious propensities. They feed principally upon insects; but not unfrequently attack young and sickly birds also. They are the avowed enemies of the owl, which they pursue with great fury. None of the titmice are migratory; but are widely scattered over every part of the old continent, and throughout the vast continent of America, and in the West Indies.

The plumage of the great titmouse, or ox-eye, is olive-green above, yellowish beneath; the head is black; the temples white; the top of the neck yellowish; the wing coverts greyish-blue, tipped with white; the tail greenish-grey. In length about five and-a-half inches.

This bird pairs early, beginning to build in February, or the beginning of March. The nest is constructed of the softest materials possible, which are generally deposited in the hole of a tree. The eggs laid are often as many as ten or twelve. The young birds do not remain longer than about a fortnight in the nest; and having once left it never return thither again.

The great titmouse is by no means a shy bird,

PENDULINE TITMICE AND NEST.

frequenting the farm-yards, cow-houses, and orchards. It is also very hardy, and may be brought up without much trouble, feeding it at first with bread and milk, afterwards with hemp seed.

The Blue Titmouse, or Tom-Tit is about an inch less in length than the great titmouse, and very much resembles it in colour. The female is somewhat smaller than the male, and her colours not so bright.

These birds are reputedly very bad gardeners, but it may be questioned whether such be the fact. Perhaps the number of caterpillars which they destroy, is an ample compensation for any little mischief they may commit. Their habits are essentially the same as the great titmouse.

PENDULINE TITMOUSE AND NEST.

(Parus pendulinus.)

The bird now to be described is chiefly remarkable for the singular nest which it builds. Birds living near the water are often noticed for some peculiarity relative to their nests. The kingfisher, for example, usually chooses a hole in the bank of a river or piece of water, where it constructs its nest, though often inconvenienced, or even destroyed, by such a choice. In like manner the penduline titmouse is always to be found near the water, on the banks of rivers, or on marshy ground liable to inundations. Such situations abounding in tall and strong reeds afford the architect fine opportunities for hanging its nest over

the water or marsh, but at such a height that no sudden rise in the water beneath shall affect the pendulous nest above; while the wetness of the ground is a sufficient protection from the truant feet of man or boy, who may chance to see this domed domicile, but who cannot approach it without hazard.

In the selection of such an abode the bird is not merely guided by a desire for security, but the situation also affords an ample supply of food, both vegetable and animal; the seeds of the aquatic plants furnishing it with the one, while the innumerable swarms of flies and other insects abundantly furnish the other. A good supply of a particular kind of food being often the reason for the choice of certain localities. We call it choice, though in fact it is anything but that, being an unerring inward guidance dictated by its Creator.

The skilfully-wrought cradle, or purse-like nest of this bird, is usually suspended at or towards the end of some willow twig, or other flexible branch of an aquatic tree or shrub. It is woven with the cotton-like down of the willow or poplar, with an opening in the side for the ingress and egress of the artificers and their young, mostly overhanging the water, or at other times interwoven among the reed stems themselves. The eggs herein deposited are generally six in number, which are white, marked with red spots.

This singular master-builder never honours Great Britain with a visit, although far from uncommon in the southern and eastern parts of Europe. It is found in Russia, Poland, Hungary, Austria, along the banks of the Danube, in France also, and in Italy.

THE YELLOW BUNTING.

The top of the head and neck of this warbler is ash-colour; the back and scapulars reddish-grey; the throat white, the lower parts assuming a rosy tint; the wings and tail blackish, bordered with reddish white; the end of the tail white. The entire length of the bird about four and-a-half inches. The long-tailed titmouse of England greatly resembles this bird in its architectural propensities, although very different in other respects.

THE YELLOW BUNTING, AND SNOW BUNTING.

(Emberiza citrinella.) (Emberiza nivalis.)

The family of the buntings is chiefly characterised by the peculiar construction of the bill. The two mandibles are moveable, and the edges of each bend inwards; the opening of the mouth not being in a straight line, as in other birds, but at the base the junction is formed by an obtuse angle in the lower mandible, nearly one-third of its length, which is received by a corresponding angle in the upper one. In the latter there is a strong knob, of great use in breaking the harder kinds of seeds and kernels, on which the bird feeds. The tongue is narrow, and tapers to a point like a tooth-pick. The first joint of the outer toe is joined to that of the middle one. To a cockney, who scarcely knows the difference between a sparrow and a peacock, to notice such differences may appear superfluous and tedious. Our apology, therefore, for introducing them must be,

that the citizen, after he shall have retired from the smoke of dingy 'Change-alley, to a cit's box in the country, may, for his amusement, be desirous of knowing the differences found among the birds with which he may be then surrounded. Birds, like the wilder animals, find their hunting-grounds so broken into by an ever-increasing population, that they are obliged to go farther-a-field for a quiet home. Birds, for example, which were formerly to be found in abundance in or near the little fishing village of Chelsea, no longer inhabit the densely-populated parish of St. Luke.

The yellow bunting, or yellow-hammer, as it is more commonly called, is one of our handsomest birds, as to plumage; but far from contributing to the harmony of our groves, is characterised by its harsh and dissonant voice. Its head, neck, and upper part of the breast, are yellow, varied with olive-green; the back and scapulars brownish, inclining to green; the wings and wing coverts blackish-brown; the greater quills black, edged with yellow. The length of the bird is about six inches.

The specific character of the yellow bunting appears to be plain; yet it is remarkable, that scarcely two of these birds are perfectly similar. Of this our readers may satisfy themselves, by a transient inspection of the numerous specimens of this bird which are in the British museum. The colours of the female vary but little from those of the male, excepting about the head, which is not so yellow; the colours also are less bright.

This pretty bird is common throughout the country, frequenting every lane and hedge. It feeds

on various kinds of seeds and insects. The yellow bunting makes an artless nest, of the basket-work kind, and lined inside with considerable care. The locality of the nest is a low bush, or amongst reeds in moist places. Many nests, however, may be found built on the ground. Grahame, in his *Birds of Scotland,* may tell the rest of the story:

> "Up from the ford, a little bank there was,
> With alder-copse and willow overgrown,
> Now worn away by mining winter floods;
> There, at a bramble-root, sunk in the grass,
> The hidden prize, of withered field-straws formed,
> Well lined with many a coil of hair and moss,
> And in it laid five red-veined eggs, I found."

The Snow Bunting is the last variety of this family which we can mention, being somewhat larger than the foregoing. Its head, neck, under parts, coverts of the wings, and the upper-half of the quill-feathers, white; the top of the back, the three secondaries, the bastard wings, and lower half of the quills, black; the three lateral feathers of the tail white, with a black streak; the others black, edged with white; the legs black. It undergoes a considerable alteration, as the winter advances, inclining then to an ash-colour.

In summer it inhabits the arctic circle, but in winter it migrates to warmer regions. The northern parts of Scotland abound with them; and they have often been seen in Northumberland and Yorkshire, but scarcely ever more to the south. Their arrival in southern countries is almost sure to betoken a severe winter, or heavy falls of snow. The snow bunting never perches, but continues always on the ground,

and runs about like the larks, which birds it also much resembles in the size and length of its hind claws.

These hardy birds pass the summer months on the hoary mountains of Spitzbergen, the Lapland Alps, and the shores of Hudson's Bay. They are known to breed in Greenland, where the female makes her nest in the fissures of the mountain rock; the outside is composed of grass, within which is a layer of feathers and the down of the arctic fox, which compose the lining of its comfortable little mansion. She lays five white eggs spotted with brown.

BALTIMORE STARLING AND NEST.

(Icterus Baltimore.)

However curiously constructed many of the nests of European birds may be, the Baltimore starling seems to surpass them all. Almost the whole genus of Orioles belong to America, and, with few exceptions build pensile nests. None of them, however, equals the Baltimore in construction of these receptacles for their young, and in giving them such a superior degree of convenience, warmth, and security. For these purposes the Baltimore starling generally fixes on the high bending extremities of the branches, fastening strong strings of hemp or flax round two forked twigs, corresponding to the intended width of the nest; with the same materials mixed with quantities of loose tow, it interweaves or fabricates a strong, firm kind of cloth, not unlike the substance

THE BALTIMORE STARLING.

of a hat in its raw state, forming it into a pouch of six or seven inches in depth, lining it substantially with various soft substances, well interwoven with the outward netting, and lastly, finishes with a layer of horse-hair, the whole being shaded from the sun and rain by a natural penthouse, or canopy of leaves. Though birds of the same species have, generally speaking, a common form of building, yet, contrary to the usually received opinion, they do not build exactly in the same manner. Some appear far superior workmen to others, and probably age may improve them in this, as it does in their colours. "I have," says Mr. Wilson, "a number of their nests now before me, all completed, and with eggs. One of these, the neatest, is in the form of a cylinder, of five inches diameter, and seven inches in depth, rounded at bottom. The opening at top is narrowed by a horizontal covering, to two inches and a half in diameter. The materials are flax, hemp, tow, hair, and wool, woven into a complete cloth, the whole tightly sewed through and through with long horse-hairs, several of which measure two feet in length. The bottom is composed of thick tufts of cow-hair, sewed also with strong horse-hair. This nest was hung on the extremity of the horizontal branch of an apple-tree, fronting the south-east, was visible one hundred yards off, though shaded by the sun, and was the work of a very beautiful and perfect bird. The eggs are five, white, slightly tinged with flesh colour, marked on the greater end with purple dots, and on the other parts with long hair-like lines, intersecting each other in a variety of directions."

"So solicitous is the Baltimore to procure proper materials for his nest, that in the season of building the women in the country are under the necessity of narrowly watching their thread that may chance to be bleaching, and the farmer to secure his young grafts, as the Baltimore finding the former, and the strings which tie the latter, so well adapted for his purpose, frequently carries both off; or should the one be too heavy, and the other too firmly tied, he will tug at them a considerable time before he gives up the attempt. Skeins of silk and hanks of thread have been often found, after the leaves were fallen, hanging round the Baltimore's nest, but so woven up and entangled, as to be entirely irreclaimable. Before the introduction of Europeans no such material could have been obtained here; but with the sagacity of a good architect, he has improved this circumstance to his advantage, and the strongest and best materials are uniformly found in those parts by which the whole is supported."

The preference given to superior materials has been noticed in other birds. "I observed," says Mr. Bolton, "a pair of goldfinches beginning to make their nest in my garden; they had formed the ground-work with moss, grass, &c., as usual; but on my scattering small parcels of wool in different parts of the garden, they in a great measure left off the use of their own stuff, and employed the wool. Afterwards I gave them cotton, on which they rejected the wool and proceeded with the cotton; the third day I supplied them with fine down, on which they forsook both the other, and finished their work with this last article."

LINNET AND SPARROW.

HOUSE-SPARROW AND LINNET.

(Fringilla domestica.) (Fringilla lanaria.)

In Hebrew, *Tziphpor.*—In English, *The Chirper.*

"*Then shall the priest command to take for him that is cleansed two* BIRDS *alive and clean.*"—Leviticus, chap. xiv., 4.

The word *Tziphpor* occurs about thirty times in the Old Testament. Its proper signification is doubtless *sparrow;* though sometimes translated *bird,* or *birds,* as in the passage above quoted; at other times *fowl,* as in Ezek. xxxix., 4.

The common house-sparrow hardly needs description. There may be some outward difference between the sparrows of London and other large towns, and those of the country; but this is merely accidental, arising from the circumstance that the poor bird, in the former localities, is always so begrimed by smoke and dirt that its real plumage is scarcely perceptible. The sparrow, though somewhat *dutch-built,* is notwithstanding rather a handsome bird; the male being distinguished from the female by a patch of black on his breast.

The sparrow, cleansed from his London dirt, or seen in the fields and stack-yards of the country, may be thus described: the top of the head and occiput are bluish-ash colour; a chestnut band above the eyes, spreading on the sides of the neck; the space between the bill and eye, throat and neck before, of a deep black; the black feathers of the neck margined with white; the feathers of the back and wings black, bordered with chestnut; a single white

band extends across the wing. The length of the sparrow is about five inches.

This well known bird is constantly found near the dwellings of man, and is often persecuted for its depredations, though it is of essential service in the general economy of nature as limiting the reproductive power of insects. It has been mentioned by an accurate observer, that one pair carried to their nest forty caterpillars in the space of an hour; so that on the supposition of their entering the nest only during twelve hours each day, they would occasion a daily destruction of 480 caterpillars, or 3,360 in a week.

The sparrow, though scattered throughout Europe, must be pronounced a genuine British bird, never leaving us, but at every season of the year to be found in the most crowded and busy parts of a town, building its nest, at the proper season, under the very eaves of our houses, in holes of walls, and, presuming to be a member of an ecclesiastical establishment, about our churches also. The nest is usually made of hay, but exhibits no great architectural skill. Indeed, the family mansion being more usually protected by a solid inclosure from the building, requires no particular skill in its builders. The female lays five or six eggs, of a reddish-white colour, spotted with brown. These birds generally have three broods in a year, beginning early, and ending late: their increase, in consequence, must be very great.

Although sparrows, Yorkshiremen like, are at home every where, and not easily *taken in* by snares and traps, they are yet no changelings, but are known to dwell in the same locality from generation to

generation, the same nest even being but a family loom.

Sparrows have no native song, their chirp being harsh and disagreeable; but being, it is said, birds of some capacity, they often, in confinement, are taught the notes of the linnet and other birds. This must be attended with some difficulty, since these birds being coni-rostral, or hard billed, are not formed for songsters by the hand of nature.

The LINNET is almost as well known as the sparrow, being common in every part of Europe. It is somewhat longer, but not so bulky, as the sparrow. The belly is bluish-grey; the prevailing upper colour is a dark reddish-brown, the lower a dirty reddish-white. During the season of love, the breast of the male assumes a beautiful crimson appearance. The legs are brown. The colours of the female are less bright than those of her lord.

The nests of these birds are built in low bushes; the outside consisting of dry grass and moss, the lining within being of hair and wool. The female lays four or five eggs of a pale blue colour, spotted with brown; and she generally breeds twice in the year.

Few birds possess greater capabilities of voice than the linnet. They may be taught either to pipe or whistle, or the notes of any other bird. But their education must be begun betimes; that is, when the bird is not older than nine or ten days. No bird is believed to be so good a schoolmaster for such youngsters as a wood-lark. Birds when thus young require peculiar treatment. The directions which Mr. Ward gives on this are important, because the expe-

rience of thirty-four years.—*Remarks on the Nature of Song Birds.* A little white bread should be soaked in water, which done, it should be strained and boiled with a little milk, but thick, like a hasty pudding. To this may be added a little rape-seed, soaked in water for ten or twelve hours, then scalded and broken fine: a portion of this must be mixed with the bread and milk. The nestlings must be fed once every two hours, from six in the morning till eight at night. When the birds are about six or seven weeks old they will be able to crack seed, and the soft food may then be gradually discontinued. About June, *branchers,* or young birds already flown, may be obtained, which require a less careful training than the nest birds just referred to.

After the breeding season linnets become gregarious, being found in large flocks, when great numbers are caught for the table.

CHAFFINCH AND RED-POLE.

(Fringilla cælebs.) (Fringilla linaria.)

Every one who only takes an omnibus journey into the country, is acquainted with the chaffinch; he hears its simple native *twick, twick,* but thinks nothing of it. Many of our continental neighbours appreciate this bird much more highly. Three centuries ago this bird is made to speak its own praise in old French, in the following quatrain, which will not admit of a translation, being a play on two

words of the first line, and for that reason we print them in capitals :—

> "Pour bien PINSER lon me nom PINSON,
> Qui ay la voix fort haultaine, et puissante,
> Je hay le chauld, froidure m' est plaisante;
> En ce contraire est à tous ma facon."

In central Germany, where the chaffinch is highly estimated, and where, when thoroughly trained, always fetches a high price; when a bird can sing or pipe the "double trill of the Hartz through, full, entire, and in all its strength," he is regarded as a prodigy. In some of the villages of Thuringia, a perfect mania seems to exist in favour of chaffinches. A cow has been given for one of these favourites; and an artizan has been known to give his louis d'or for a chaffinch, which he admired, though he should be obliged to live on bread and water to gain the money to pay for his pet. An amateur, hearing one of these finished songsters, is thereby thrown, it is said, into a perfect ecstasy. But there is one remarkable peculiarity in the chaffinch which does not apply to other piping birds: he must be taught his song *anew* every year.

The male bird is remarkable for the cleanliness and trimness of his plumage, which, without having any great variety or splendour of colouring, is so composed and arranged, and the white on his wings so brilliant, as to render him a beautiful little creature. The female is as remarkable for the quiet unobtrusive tintings of her dress; and when she lies crouching in her nest, elegantly formed of lichens from the bark of the apple-tree, and faded mosses, she would hardly be perceptible but for her

little bright eyes that peep with suspicious vigilance from her covert. We will just add that the colours of this bird are attractive. Its bill is pale blue, tipped with black; the upper parts of the body of a bluish-ash; the sides of the head, throat, and neck vinaceous red; belly and thighs white, tinged with red; the back reddish-brown, inclining to green towards the tail; the greater and lesser coverts are tipped with white; the bastard wing and quill feathers black, edged with yellow; the tail black, edged with white; the legs are brown.

The chaffinch is one of our neatest architects, constructing the nest of small fibres and moss, and lining it with wool, hair, and feathers. The colour of the nest is made to correspond in colour with the branch on which it is placed. The female lays five or six eggs, of a pale reddish colour, sprinkled with dark spots. The male is most attentive to his mate, seldom straying far from the place, and then only to procure food. He is also very jealous, maintaining most desperate battles with any intruder.

It has long been known that these birds, in Sweden, and other northern countries, perform a partial emigration; the females leaving their mates, and spreading themselves through various parts of Europe. A modern ornithologist, Mr. Selby, states that his experience enables him to say that the same thing happens in England.

In Northumberland and Scotland this separation takes place about the month of November, and from that period till the return of spring, few females are to be seen, and those few always in distinct societies. The males remain, and are met with, during the

whole winter, in immense flocks. This separation of the sexes appears to take place with many other birds beside the chaffinches.

These birds have the reputation of being very bad gardeners. In March, the florist often finds that the polyanthuses, in the sheltered borders, are stripped of all their blossoms by these pretty plunderers. The horticulturist, likewise, prefers a true bill of indictment against them, because the young turnips and radishes are most dexterously drawn up, so soon as they appear upon the surface of the soil, by the same marauders. The redeeming qualities in chaffinches, however, seem to make ample reparation for any mischief which they may do: they rid both the florist and the gardener of thousands of insects and larvæ.

The RED-POLE will require but a passing notice. This pretty little warbler may readily be known by a large purplish red spot on the forehead; the breast also being marked with the same colour, but not quite so bright; the lower parts are of a dingy white. The female, though like the male, has not this purplish red.

They make a shallow open nest of no great pretensions; the female generally laying four eggs, almost white, marked with reddish spots.

The habitat of this bird is extensive, spreading over all the northern parts of Europe, from the extreme parts of the Russian empire to Italy; it is also common in North America, and in the northern parts of Asia. They migrate towards the south on the approach of winter.

THE GOLDFINCH.

(Fringilla carduelis.)

"Chaste are their instincts, faithful is their fire,
No foreign beauty tempts to false desire;
The snow-white vesture and the glittering crown,
The simple plumage, or the glossy down,
Prompt not their love. The patriot bird pursues
His well acquainted tints, and kindred hues:
Hence through their tribes no mixed polluted flame,
No monster-breed to mark the grove with shame;
But the chaste blackbird, to its partner true,
Thinks black alone is beauty's favourite hue;
The nightingale, with mutual passion blest,
Sings to its mate, and nightly charms the nest;
While the dark owl to court his partner flies,
And owns his offspring in their yellow eyes."

Slavery is a hateful word when applied to irrational creatures, but when applied to any part of the family of man, becomes monstrous, because iniquitous. If man has any natural birth-right, it must be liberty. Liberty of conscience towards God; civil liberty amongst his fellow-men, with whom he equally shares this blessing. Every just and free government must protect these essential prerogatives, or expose itself to censure and revolt. The slavery of one race of human beings by another is terrible; and in the world's history must come to an end. The days of slavery, we believe, are numbered, and that ere the nineteenth century is much farther advanced, the era of universal freedom must arrive. Our sons on the other side of the Atlantic, now become so numerous and strong, and who, we acknow-

ledge, received the traffic in human flesh from us, are upon the point of fulfilling their own declaration of INDEPENDENCE, so nobly made in 1776.

Our children in the United States, especially those of the Northern States, have some of the best of our Anglo-Saxon blood flowing in their veins; and though they may not, at the bidding of us their fathers, do this act of justice, yet must they do it, urged by the advances which civilization and religion have made.

The slavery of any part of the human race always brings with it frightful evils, physical and moral, without any redeeming good whatever. In irrational creatures it may be otherwise. To deprive them of liberty, may at first sight appear unnatural; yet are many redeeming qualities connected with it, which turns captivity itself into a blessing. Captivity may be done by law, since the express words of the statute book are—"Let them," (the human family) "have dominion over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth." Gen. i. 26.

Take the horse and the cow as examples amongst our domestic animals. They have, doubtless, lost their original freedom, and become subjugated to the will of man; but see, in return, how well they are protected and provided for. The husbandman takes care to appropriate a large portion of the produce of the land for the maintenance of his dependents, storing up both corn and hay for winter's supply; together with the erection of stables and sheds for their defence from bad weather. The

horse, naturally timid and a fugitive, is, in captivity, taught courage by his owner, so "That he mocketh at fear, and is not affrighted."—"He swalloweth the ground with fierceness and rage."—"He saith among the trumpets, Ha, ha; and he smelleth the battle afar off."—Job xxxix., 22—5.

In like manner are the songsters made captives by man's power; but soon they forget their captivity in the abundance with which, without any care, they are so well supplied; and further, man elicits from the birds that, which but for their captivity, would for ever have continued undeveloped. Take the goldfinch as an example: nature has clothed him in a gay livery, making him one of the handsomest amongst his fellows, endowing him likewise with habits remarkably quiet, and amiable. Unlike the titmouse, or even the robin, he is neither jealous or pugnacious; satisfied with what he is in himself, he neither seeks aggressive war, or makes a defence, in the event of an attack, but by retreat. His natural song is sweet, but short; whereas under the instructive care of his owner, he is made a singer, or a piper, of the first order, and is also rendered expert in various arts and tricks. Yet the loss of liberty in this pretty vocalist is attended with a loss of chastity. The smaller birds in their native woods, never form any connubial connexions with any but those of their own kind, remaining faithful to each other under all circumstances. Should death dissolve the hymeneal bands, either in the male or female, there seems no difficulty in supplying, by some mysterious law not to be explained, that deficiency, but always with one of their own species. In captivity, on the

contrary, this law is destroyed. At the appointed season of love, cage-birds not having liberty of ranging abroad in search of a suitable mate, submit to another law, scarcely less mysterious than the former, and take up with the mate which they can find. This, however, only applies to a few birds. The progeny of such a union produce what are called mule birds, which sometimes possess a capability of breeding, at other times not. This is another mysterious law in animal economy which has never been explained.

The design of these remarks is to shew that the natural habits of birds can only be learned from birds which are at large. The moment captivity begins, their habits become altered likewise, or at least they conform to the circumstances in which they are placed.

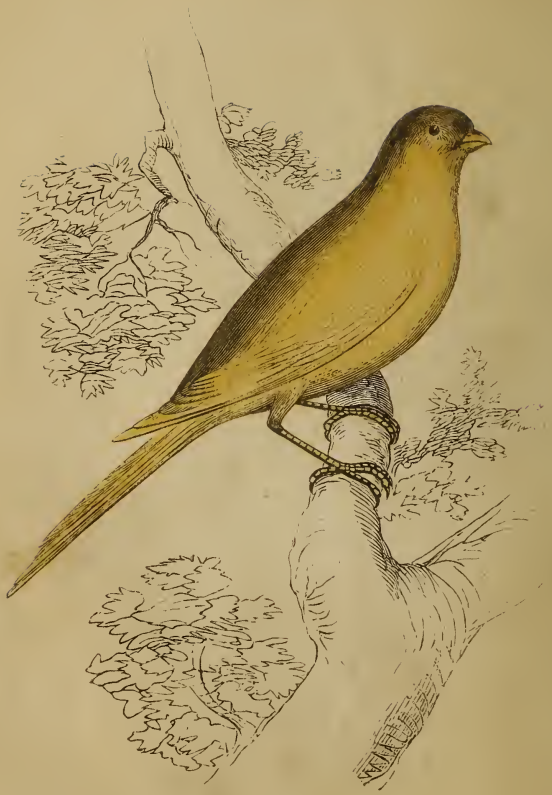
The goldfinch may be thus described; the forehead and throat crimson; occiput and neck black; fore part of the neck and lower parts of the body white; the back, scapulars, and lateral parts of the breast brown; the upper part of the wing feathers pure yellow, the other black, with whitish spots towards the end; tail black, with long white spots; bill whitish, the tip black. The length of the bird is about five-and-a-half inches. The female somewhat less than the male, and the colours less brilliant.

This bird is deservedly a great favourite, taking the lead amongst our native cage birds. In captivity goldfinches sing the greater part of the year; the moulting times always excepted. Their education must be early begun if they are expected to

excel in song. A nest bird, for this reason is always to be preferred. By attention their attachment may be gained, when they become apt scholars both in the singing-school and the play-ground, learning a variety of little tricks, such as to draw up small buckets containing their water and food, to fire a cracker, and such like. They greatly excel the chaffinch in strength of memory, so that what is once well learned, is learned for ever. Birds caught about Michaelmas generally turn out the best singers.

When the spring has advanced, and the trees display a verdant appearance, the goldfinch separates in pairs, each male taking a mate, and quitting the wild and open country for woods, orchards, and gardens, and on the Continent, for the rows of fruit-trees that border the road-side. So soon as the foliage becomes dense enough to conceal the nest, the task of incubation is commenced; the nest is placed in the fork of a branch, and is of the neatest construction, being composed of lichens, moss, and dried grasses, lined with hair, wool, and the seed-down of the willow and thistle; the eggs are four or five in number, of a bluish-white, spotted with brown.

The geographical range of the goldfinch is considerable, extending from the southern isles of the Archipelago to Siberia; it is also common in many parts of France and Germany. It is a constant resident in the British isles, and in Italy it passes the summer in the mountains, and the winter in the plains. In Holland, however, it is a bird of passage. The goldfinch, in general, seems to give preference to high lands and mountainous districts during winter; particularly such as are wild and barren, and



afford a plentiful supply of the thistle and plantain, the seeds of which constitute its principal food. During the winter it is gregarious, flying together in small flocks.

The male goldfinch, in captivity, readily pairs with hen canaries; and their progeny are often handsome birds, and good singers.

THE CANARY FINCH.

(Fringilla canaria.)

This bird in its wild state is principally found in the Canary Islands, frequenting damp places; and at Palma, Fayal, Cape Verd, and Madeira.

Doctor Heineken gives an elaborate description of the canary-finch as it appears on the Island of Madeira. "It builds," the Doctor tells us, "in thick bushy high shrubs and trees, with roots, moss, feathers, and hair; it pairs in February, lays from four to six pale-blue eggs, and hatches five or six times during the season. It is very familiar, haunting and breeding in gardens about the city. It is a delightful songster, with, beyond doubt, much of the nightingale's and sky-lark's, but none of the wood-lark's song; although three or four sky-larks in confinement in Funchal, are the only examples of any of these three birds in the island, and notwithstanding the general opinion that such notes are the result of education in the canary: it is in full song about nine months of the year. I have heard one sing on the wing, and passing from one tree to another at some

distance, and am told that during the pairing season this is very common. Each flock," continues the Doctor, "has its own song, and from individuals in the same garden differing considerably, I suspect that each nest varies more or less. After the breeding season, they flock along with linnets, goldfinches, &c., and are then seldom seen in gardens. The moult takes place in August and September. An old bird caught and put into a cage will sometimes sing almost immediately, but seldom lives longer than the second year in confinement. The young from the nest are difficult to rear, dying generally at the first moult. They cross readily with the domesticated variety, and the progeny are larger, stronger, better breeders, and, to my taste, better songsters also than the latter; but a pure wild song from an island canary, at liberty, in full throat, and in a part of the country so distant from the haunts of men, that it is quite unsophisticated, is unequalled, in its kind, by any thing I have ever heard in the way of bird music."

We give this long extract from Dr. Heineken, because it seems to correct a mistake into which we have fallen, that native birds have little or no song; still it must be allowed that the canary-finch is no exception to the general rule, that an education and training will do much for this bird, both as to its general appearance, colour, and song. We are free to admit, that the canary-finch, with all its native excellence, never has the full development of size, beauty of plumage, or brilliancy of song, exhibited by birds in captivity.

Beckstein, who has devoted much atttention to

cage-birds, denies that the canary-finch was introduced into Europe so early as the fourteenth century. He believes that it was unknown until the beginning of the sixteenth century. "A vessel," he says, "which, in addition to its other merchandize, was bringing a number of these birds to Leghorn, was wrecked on the coast of Italy, opposite the island of Elba, where these little birds, having been set at liberty, took refuge. The climate being favourable they increased, and would certainly have become naturalized, had not the wish to possess them occasioned their being caught in such numbers, that at last they were extirpated from their new abode. From this cause Italy was the first European country where the canary was reared. At first their education was difficult, as the proper manner of treating them was unknown; and what tended to render them scarce was, that only the male birds were brought over—no females. The grey of its primitive colour, darker on the back, and greener on the belly, has undergone so many changes from its being domesticated, from the climate, and from the union with birds analagous to it, that now we have canaries of various colours.

We proceed to give our readers a more detailed account of the varieties of these interesting songsters, and the best manner of breeding and rearing them. Canaries then are now principally divisible into the following varieties:—the grey, the yellow or jonque, the white or mealy, the blackish, and the chestnut; and it is from their combination, and their tints, that we derive the numerous varieties which we now possess. We wish our readers specially to notice that as,

according to an old proverb, a good horse cannot be of a bad colour; so is it with canary-birds. The mere colour has more to do with the fancy of the owner, than with the excellency of the bird's song. Those canaries that have the upper part of the body of a dusky green or linnet brown, and the under part the yellowish-green of the green-bird, with dark brown eyes, are the strongest, and most nearly resemble the primitive race. The yellow and white often have red eyes, and are the most tender. The chestnut are the most uncommon, and hold a middle rank for strength and length of life, between the two extremes. The canary now much admired is one with the body white or yellow, the head (particularly if crested), wings, and tail yellowish dun; the second in degree is of a golden yellow, with the head, wings, and tail black, or at least dusky grey. Next the grey or blackish, with a yellow head and collar; and the yellow with a blackish or green tuft, which are very much valued. The irregularly spotted are much less sought after.

In modern times, however, excellency of song has given place to beauty of plumage, and regularity of feather. The birds most valued by amateurs are, beyond all doubt, the *orange, with black wings, tail,* and *legs:* they ought also to have *black spangles on the back.* For the production of such birds, societies have been formed in London, and elsewhere, and prizes given at an annual show. These fancy birds are usually sold at from three to four guineas a pair. It is also remarkable that the hen birds are of equal value with the cocks. Crested or turned crowned birds are considered irregular, and are consequently

less valued. The Belgian canaries are much larger and stronger than those of England. Their song also is very superior. These birds are brought over for sale in the autumn of the year. The German canaries are also held in considerable estimation.

The male and female canaries greatly resemble each other, but generally speaking, the hen bird is less bright in colour, smaller about the head, shorter about the neck and body, not so long in the legs, and of a less elegant form. The usual length of a canary is about five inches, of which the tail measures two and a quarter. The bill is strong, sharply pointed, and inclining to white.

In the opinion of Bechstein the following are the best directions for the breeding of canaries :—About the middle of April, either one male, and one or two females, are placed in a large cage, or many of the sexes are united in a room or aviary, having the advantage of a south-east aspect. Nest-boxes or baskets made of turned wood, or osiers, are given them. Slips of the pine tree which are cut in February may advantageously be placed in the aviary or cage, since they do not lose their leaves. If a wire gauze merely can be placed over the window of the room all the better, the enjoyment of fresh air greatly contributes to promote the health of the pretty prisoners, especially to make the young healthy and robust. Birds which are to be paired for the first time, should previously be put together in the same cage for seven or eight days, to become acquainted and accustomed to live together. If two females are to be caged with one

male, it is especially necessary that they should be together long enough to leave off quarrelling, and the pairing-cage should be divided into two equal parts, communicating by a sliding door. This being done, a lively male, and one of the females, should be placed in the first division; so soon as she has laid, the male should be moved into the other division, the door of separation being shut; but as soon as the other has also laid, the door may be left open: the male will then visit the females alternately, and they will not trouble themselves about each other; but without these precautions, jealousy would incline them to fight and destroy each other's eggs. When it is intended to place a great many females, double or treble the number of males in a room or aviary, the latter should always be first paired with a single female, which will ever after remain the favourite; and it will only be when she is about to sit that he will pair with the others; and this is all the notice he will take of them, for afterwards he will only notice their young. It is from these mothers, however, that the most and the best birds are generally procured. If the floor of the room or aviary is well covered with moss, little else need be added for making the nests, otherwise they should be supplied with the hair of cows and deer, wool, moss, and the like. That which is coarsest, serving for the outside, and the softest and finest for the inside. If they have shrubs, the canary will, probably, shew her native propensities by building without the baskets, but they discover no very great architectural skill in the nest, which is carelessly finished. The females alone are the builders, the males, perhaps, choosing the situa-

tion, and bringing the materials. Each female should be provided with two nest-boxes or baskets, least she should build, the second time, upon her young, and thus smother them. Seven or eight days elapse from the pairing to the laying of the first egg; the other eggs, seldom exceeding six, are laid successively every following day. The eggs are of a white greenish cast, with deep red spots and splashes at the larger end. If the pairs agree, they must be left entirely to themselves, without endeavouring to use art to help nature. It is believed much the better way not to remove the eggs at all from the nest, and that better success follows by leaving them to be hatched in succession. The hen canary will generally lay four or five times in the year, from April to September, and some will even continue to lay during their moult. About the eighth day of incubation, the eggs may be examined by holding them between the flame of a candle and the eye; the good will exhibit well developed blood vessels, whereas the bad ones will continue clear, or be already addled—and may be thrown away. It is, in our judgment, much the better course to leave the eggs entirely alone. The cock will sometimes take his turn in sitting for some hours in the day; but the hen, not approving of this, generally takes her hasty meal, returns to the nest, and if the cock does not immediately retire, she will continue to peck him till he does. This is especially the case the nearer the time for hatching approaches. On the thirteenth day the young usually make their appearance. During the period of incubation all loud noises or moving of the cage should be scrupulously avoided.

Immediately on the young leaving the shell, a small trough should be placed near the feeding place. In this may be put a portion of hard egg, yolk and white together, chopped very fine, a portion of crumb of bread or biscuit, which has been soaked in water, and afterwards well pressed to get out the moisture, with a little maw-seed. Embden groats may also be placed in the cage. Extreme care must be taken not to let this food become sour, which would prove destructive to the young birds.

About the thirteenth day the youngsters will begin to feed themselves, and when about a month old they may, if necessary, be removed to other cages. Should the hen bird begin to peck them previously to this period, they may be safely removed, provided such an arrangement be made that the cock bird can get at them through the wires of his cage, since he will continue to feed them so long as occasion may require. In all cases he is the principal nurse. After their removal from the parent birds, they must continue to be supplied with the soft food above described, together with the food of full-grown birds, as a sudden privation of the former might occasion disease, if not death.

When the nestlings can eat alone, the male birds will begin to warble, and may easily be distinguished from the females. The hen birds will also make a jabbering noise; but if the passage of the throat is seen to heave with a pulsive motion, swelling like a little pair of bellows, we may safely conclude that it is a male bird. The vigour and majestic carriage of a bird is another indication of its sex; extending the

neck and head, as if it would endeavour, like too many mortals, to be something more than itself. The general shape of the male is always more dapper than the female, especially towards the tail. It is further noticeable that male birds, be they whatever colour they may, will always have a little yellow almost upon their bills, and under their throats, and a bright strong yellow stroke over the eyes. The males thus selected should be placed each in a separate cage, which must be first covered with a piece of linen cloth, and afterwards with a darker curtain. Apart from every other bird education should now begin. If it be intended that his natural song should be superseded by an artificial melody, then it is absolutely necessary that he should not have the opportunity of hearing his father's song after the fourteenth day, otherwise his acquired melody will be murdered, and he will ever after retain a portion of his paternal notes, and intermingle them in his song. His musical lessons must be repeated five or six times in the day, especially in the morning and evening, his master performing the desired air either on a flageolet, or a bird-organ; but if the instrument be not in perfect tune, the whistling of a man of taste is greatly to be preferred. From two to six months, according to the memory and abilities of the scholar, must be spent in this musical education. Canaries may thus be taught to repeat correctly two or three airs, or even, it is said, to pronounce distinctly a few short words. In this training the scholar, under favourable circumstances, will evince great quickness and correctness of ear, combined with excellent strength of memory.

Should the owner of the bird prefer the natural song, which in a bird having such capabilities as the canary, will probably be the case, then it is only necessary to continue him a little longer in the hearing of his natural warbling, and to place him within the sound of the nightingale, wood-lark, or tit-lark, according to the notes which may be desired, and he will be sure to incorporate his original notes with those of the bird which he is accustomed to hear. In Germany it is not at all uncommon to correct the noisy bursts in which canaries are naturally inclined to indulge, by teaching them to descend regularly through all the tones of the octave, until they can pronounce the same with a smooth silvery tongue. Canaries will sing in the evening, especially if placed near a strong light.

The canary-finch must be pronounced rather a delicate bird, and therefore requires special attention. The food generally given them is rape and canary seed, mixed in about one-third of the former, to two-thirds of the latter. They are also pleased by having a little green meat, such as plantain, water-cresses, lettuces, or any short and esculent vegetables. A lump of sugar may also occasionally be given, and a little sopped bread. Care should be taken for them to have a daily supply of good fresh water. They should also have the opportunity of bathing. The bath may be affixed to the cage, so that the birds may have free ingress to it; the water of the bath being renewed daily. The application of any powder, or ointment to the bird, must be carefully avoided, since this often proves destructive. The cage and nest must be carefully examined, least

they should have any vermin: frequent ablutions are the best remedy for this. The birds must be kept very clean: the bottom of the cage should be carefully cleansed by being scraped with a blunt knife, at least twice every week; red sand being sprinkled, from time to time, over the bottom of the cage. In the event of the cage, or any part thereof being wetted, it is essential that it should be thoroughly dry before the birds are restored to it.

Nothing is more injurious to birds than bad smells. Should the room in which they are be painted, or whitewashed, or even the adjoining room, the birds must be removed from the effluvia. Neglect in this matter has destroyed many a valuable bird. Finally they must be protected from extremes of heat and cold; not be left out at night; exposed to any direct draughts; or be left in a cold room during the winter months. At the same time, the room in which they are must not be too warm, since this will produce a premature, or continual moult, both of which would prove most injurious. We believe that attention to these remarks will go far towards keeping the birds in health, and preventing those diseases which might otherwise come upon them.

Canary birds, with proper care, will live for fourteen or fifteen years.

We will only add in conclusion, that though birds of different species in a state of nature are never known to pair, yet, that in confinement some very pretty hybrids may be produced. They are principally six:—first, mules, bred from a canary and a goldfinch; second, from a canary and a siskin; third,

from a canary and a greenbird; fourth, from a canary and a linnet; fifth, from a canary and a bulfinch; and sixth, from a canary and a nightingale. In all these six instances the canary should be the mother. The reason for this is, that other females but the canary cannot be induced to lay their eggs in an artificial nest. The progeny of the first four of these hybrids are known themselves to be fruitful.

THE WHIDAH-FINCHES.

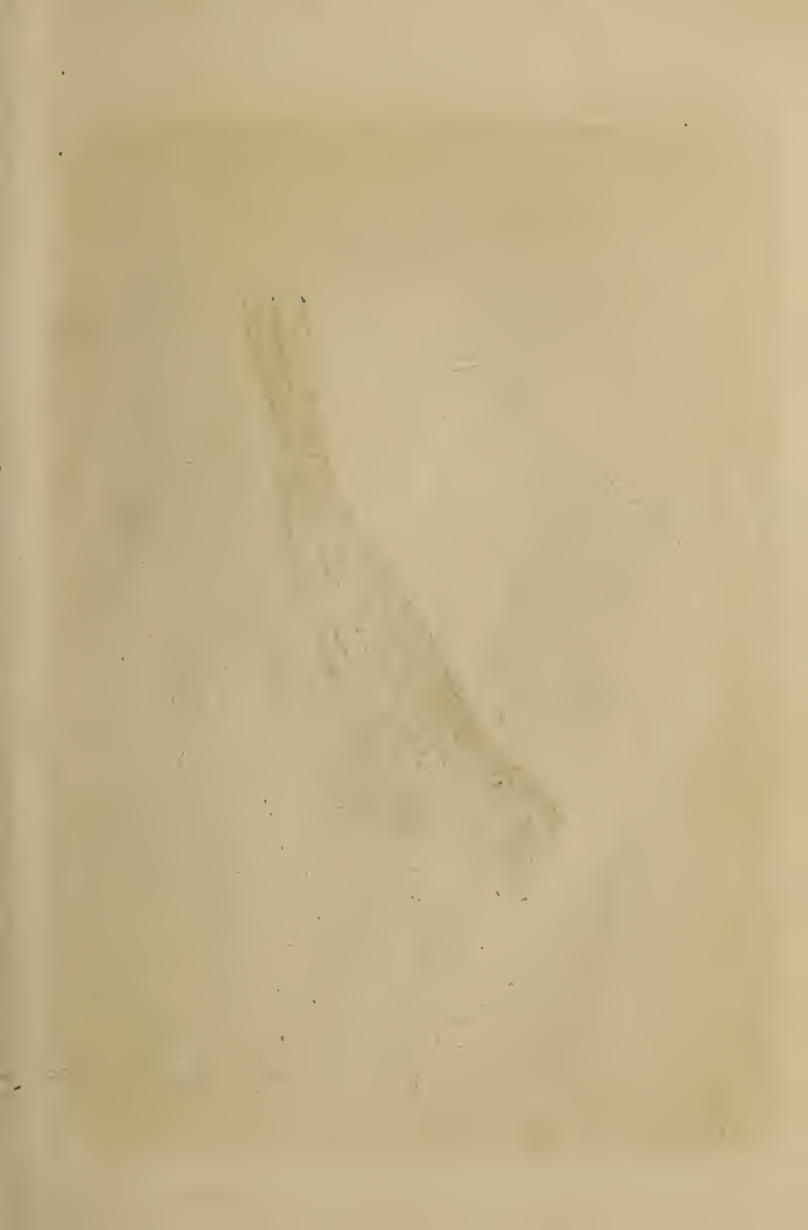
THE widow birds or African buntings, are favourites for the cage and the aviary, from their long drooping tail feathers, which adorn the males during the breeding season.

We notice two species. First, the VIDUA PARADISEA, or *widow of Paradise.*

The upper part of the plumage of this bird is of a deep brownish-black. A broad rich orange-rufous collar proceeds from the upper part of the back of the neck, and unites with a tinge of the same colour on the sides of the neck and breast. The tail feathers are black; the two middle ones often measure a foot in length, although the size of the bird does not exceed that of a canary. The bill and feet are black.

Its habitat is south-western Africa. In the neighbourhood of Senegal it is common.

The second species is the VIDUA ERYTHRORHYNCHUS, or *red-billed widow.*



THE CROSSBILL.

This variety is also a native of western Africa. In size it is somewhat less than the last described, and in other respects is a little different. The bill is shorter, thicker, and broader. In the elongated feathers of the tail, two are convex, and two concave, so that the four feathers form a sort of cylinder; and but for their extremities appear at first sight as one. The general colour of the head and back is a deep blue-black, with a collar of pure white. The ears, sides of the head, and all the under parts, are also of the same colour. The tail feathers are externally black, internally white.

The general habits of both species are but little known. Specimens of them may be seen in the British Museum.

GREEN-GROSBEAK AND CROSSBILL.

(Loxia chloris.) (Loxia curvirostra.)

THE green-grosbeak, or green-finch, is one of a large family, more numerous, and better known than most others. Some of this species are migratory; the greenfinch is an exception to this rule, continuing with us during the whole year, only changing its quarters according to the season. It is to be found in every part of Great Britain, throughout Europe, and in North America. During the winter months these birds are gregarious, keeping together in small flocks, and gradually approaching villages and farm-yards, in search of food and shelter.

The song of the green-finch is little more than a chirp; it is notwithstanding often kept in a cage from its extreme docility and aptitude as a scholar. The hybrids of the green-finch and the canary are very often pretty in plumage, and under proper instruction, good songsters also.

The nest is usually made of dry grass, lined with wool or other warm materials, the locality chosen for it being a hedge or low bush. The usual number of eggs laid are from five to six, of a pale-greenish colour, spotted with reddish-brown. The male bird is said to be unremitting in attention to its mate during the time of incubation, taking his turn also in sitting. The female is so close a sitter that she may be often taken on the nest.

The plumage in general is a yellowish-green; the top of the head, neck, back, and lesser coverts, olive-green, the greater coverts ash-coloured; towards the tail yellow more prevails; the bill is flesh-coloured; the eyes dark.

The Crossbill can scarcely be called a British bird, since its visits to Great Britain are rather accidental than regular, sometimes not being seen in any part of this country for years together. Its plumage is singularly beautiful, from which, and from its crooked bill, it has sometimes been called the German parrot. It is common both in the north of Europe and America.

The talented but sceptical Buffon remarks, that the bill of this bird exhibits an error in its Creator. Had this author have better acquainted himself with the habits of this bird, he would not have pronounced the peculiar organization of this bird a deformity.

"My pets," says Mr. Townson, speaking of the crossbill, "would often come to my table whilst I was writing, and carry off my pencils, little chip-boxes in which I occasionally kept insects, and other similar objects, and tear them to pieces in a minute. Their mode of operation is by first pecking a little hole; in this they insert their bill, and then split or tear the object by the lateral force. When I treated them, as I often did, with almonds in their shells, they got at the kernel in the same manner, first pecking a hole in the shell, and then enlarging it, by wrenching off pieces by the lateral power." Another writer says, "notwithstanding Buffon's assertion to the contrary, they can pick up and eat the smallest seeds, and shell or husk hemp, and similar seeds. They are impatient in confinement, and notorious for their unceasing destruction of the cages in which they are kept."

In colour the crossbill is ash, tinged with green; cheeks and eyebrows grey, with yellow and white spots; yellow towards the tail, the lower parts being yellowish-green; the bill horn-colour; the length about six inches.

The nest is chiefly placed in a forked branch of a lofty pine, and is built of moss, lichens, and such like, with a lining of feathers. Four or five eggs are generally laid. These birds often build even before the winter is past, in more temperate climates, as early as January. Bewick remarks, that for better securing their nests, the crossbills often fasten it to the tree by employing a resinous matter which exudes from the pine, applying the same to the outside of the nest, and hereby making it water-proof.

THE RAVEN.

In Heb. *Oraiv.*—(Corvus corax.)—In Eng. *The Black-one.*

"*Who provideth for the* RAVEN *his food? when his young ones cry unto God, they wander for lack of meat.*"—Job, xxxviii. 41. *He giveth to the beast his food, and to the young* RAVENS *which cry.*"—Psalm cxlvii., 9.

This bird is the largest of the crow family, being more than two feet in length. The bill is very strong and thick, measuring about two and-a-half inches, and covered at the base, and above half its length, with long hairs. The colour is a glossy blue-black in the upper parts, those beneath being of a dusky hue.

The raven seems to be more widely scattered than almost any other bird. It is capable of braving alike the severity of an Arctic winter, and enduring the scorching rays of a tropical sun; and without any change being produced in its plumage by the extremes of climate.

The raven is found in the old Continent from Greenland to the Cape of Good Hope, and in the New from Hudson's Bay to Mexico. It is also met with by our circumnavigators in the Sandwich Islands, and in other parts of the Southern Pacific.

The habits of this bird are every where alike. It is always in search of the distressed, the dying, and the dead. In Lincolnshire and Leicestershire the raven is ever on the alert in the sheep-walks, so that no sooner is a poor sheep *cast,* that is, fallen on its back and unable to rise, than this marauder approaches and pecks out its eyes. It frequents

THE RAVEN.

barren grounds, even in the most severe winter colds; its movements being directed in a great measure by those of the herds of rein-deer, musk-oxen, and bisons, which it follows, ready to assist in devouring such as die, or are killed, by wild beasts or accident. No sooner has a hunter slaughtered an animal than these birds are seen coming from various parts to feast upon the offal; and considerable numbers also constantly attend the fishing stations, where they show equal boldness and voracity.

A propensity for theft seems a part of their nature. That ravens, when domesticated, should desire to carry off an attractive substance, as pieces of money, or the like, may be capable of solution; but that this should be the case in a secluded spot in its native wilds, is surprising. Yet a traveller (Mr. Kendall), tells us, that in crossing the height of land which divides the waters that flow towards Hudson's Bay, from those which fall into the Arctic sea, he saw a raven flying off with something in its claws, pursued by a number of its clamorous companions. The bird being fired at, dropped the object of contention, which proved to be the lock of a chest.

The aptitude of the raven for articulating sounds distinctly has been noticed in all ages. Many extraordinary instances might be mentioned of this. There is, or was, until lately, a raven at Chatham, which was a remarkable proficient. Living in the vicinity of a guard-house, the bird has, more than once, turned out the guard, who thought they were called by the sentinel on duty.

The raven, moreover, in times of ignorance, was considered as ominous; foretelling future events by its horrid croakings, and announcing impending calamities. Gay has well told the story in his fable of the farmer's wife and the raven:—

"That raven on yon left hand oak
(Curse on his ill-betiding croak!)
Bodes me no good." No more she said,
When poor blind Ball, with stumbling tread,
Fell prone, o'erturned the pannier lay,
And her mash'd eggs bestrew'd the way.
She, sprawling in the yellow road,
Rail'd, swore, and curs'd: "Thou croaking toad,
A murrain take thy whoreson throat!
I knew misfortune in thy note."
"Dame," quoth the raven, "spare your oaths,
Unclench your fist, and wipe your clothes.
But why on me those curses thrown?
Goody, the fault was all your own;
For had you laid this brittle ware
On Dun, the old sure-footed mare,
Though all the ravens of the hundred,
With croaking had your tongue out-thunder'd,
Sure-footed Dun had kept her legs,
And you, good woman, sav'd your eggs."

This bird makes its nest early in spring, and builds in trees and the holes of rocks, laying five or six eggs of a pale bluish-green colour, spotted with brown. The female sits about twenty days, and is constantly attended by the male, who not only provides her with abundance of food, but relieves her in turn, and takes her place in the nest.

The raven is several times mentioned by the sacred writers. On the decrease of the waters of the flood, Noah sent out this bold and adventurous bird, from one of the windows of the ark, which went forth to

and fro, or rather, according to the Hebrew, in going forth and returning, until the waters were dried up from off the earth.—Gen. viii. 7. We are also informed that Elijah, the prophet, was, at the divine command, supplied with food by ravens. Some, however, tell us, that the *orebim* spoken of in the sacred text (1 Kings, xvii. 6), were not ravens, but Arabians. We confess that we greatly dislike such forced interpretations of Holy Scripture, and would guard our young readers especially against them. It is remarkable that Solomon should have recorded the extraordinary propensity which the raven has for pecking out the eyes of its prey. "The eye that mocketh at his father," says the wise man, "and despiseth to obey his mother, the ravens of the valley shall peck it out, and the young eagles shall eat it."—Prov. xxx., 17.

ROOK AND CROW.

(Corvus frugilegus.) (Corvus corone.)

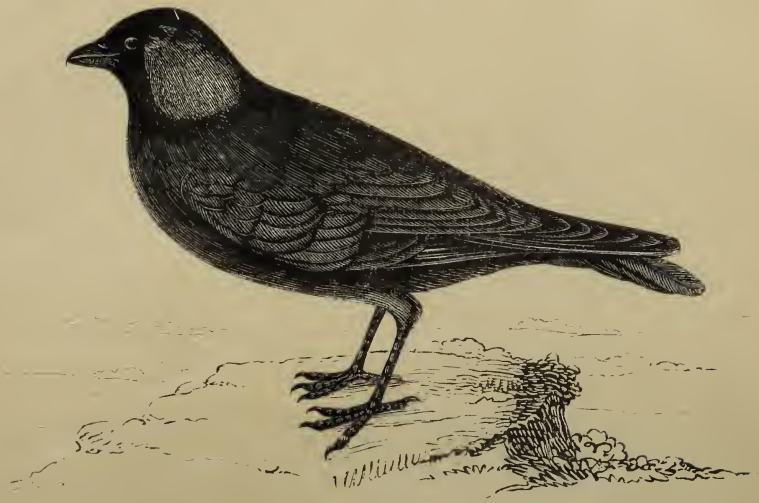
THE rook and the crow greatly resemble each other, but are yet never known to unite or live together. The plumage of the former is much more glossy than the latter, and is farther distinguished by a rough scabrous skin, which extends from the base of the bill to the eyes. Rooks are gregarious, flying together in immense flocks morning and evening, from their roosting-places, in search of food, which consists of chafers or dor-beetles, and such like, which they dig up with their strong bills. It cannot but

be confessed that they often commit great depredations on the corn-fields. They return to the same domicile from year to year, which not unfrequently causes severe contests, should any new-comers chance to occupy their former abodes.

These birds are spread over Europe; and though stationary with us, yet in France, Silesia, and other countries they migrate. In France they are the forerunners of winter, whereas in Siberia they announce the summer. Their flights are sometimes so dense as to darken the air, being frequently joined by troops of crows, jackdaws, and starlings.

Crows are very widely diffused, being common in most parts of the world. Their food consists of flesh, worms, insects, and grain. Their love for *carrion* has caused them to be designated by that word: neither do fish, fruits, or even shell-fish escape the notice of these cormorants; of which latter they contrive to break the shell by dropping them on a hard surface from a height. Weakly lambs not unfrequently fall victims to carrion crows; and they will, like the butcher bird, pursue birds on the wing for food. The crow may be taught to articulate several words: it has, besides, the same propensity for hoarding up provisions, and glittering trinkets as the raven.

This bird must not be confounded with the hooded, or Royston crow, which is migratory; not appearing in this country till the beginning of winter with the woodcocks, and on their first coming frequent the shores of rivers. They depart in the spring to breed in other countries of higher latitude.



THE JACKDAW.

MAGPIE AND JACKDAW.

(Corvus pica.) (Corvus monedula.)

The magpie is a pretty, active, and familiar bird. It readily becomes domesticated, and soon develops those propensities so common to this species of birds, stealing and hiding things which it may chance to meet with; it also articulates words with considerable distinctness. The bill is long, with cutting edges, and its base covered with short feathers. The tail is very long and graduated. The length of the bird is about eighteen inches.

In appetite this bird is omnivorous, taking alike animal or vegetable food. The nest is often a curiosity, being very firmly built on the summit of the tallest trees, and well fortified with black thorn twigs. The eggs are generally six or seven in number, of a yellowish-white, with brown spots. During the time it has young, the magpie is rather a dangerous neighbour to the poultry yard, since it will boldly attack and carry off both chickens and ducklings.

These birds are no less plentiful in America than in Europe. It is singular, however, that though common on the shores of Sweden, and other maritime parts of the Old World, it is very rare on the Atlantic shores of America, or near Hudson's Bay. The manners of the American magpie are, in all respects, similar to the European bird.

The Jackdaw is rather larger than the magpie, but less than the rook and crow. Its colour is a violet black.

This bird feeds chiefly on worms, the larvæ of insects, and fruit, but especially cherries. It is much more fond of the habitations of man than the magpie, often building its nest in the towers of churches, or in ruined buildings, always preferring the upper parts. The quantity of materials brought by these birds is often much more than is necessary for building their nests, and which in belfries, and other such places, accumulates to a very considerable quantity. Jackdaws are completely gregarious.

Like magpies these birds may easily be tamed; but under the best tuition, they remain mischievous and tricky.

BLUE JAY AND STARLING.

(Garrulus glandarius.) (Sturnus vulgaris.)

The body of the jay is a reddish ash-colour; the head white, with black streaks; the wing coverts marked with blue and black bars; its bill and tail black; iris blue; the legs dark brown; length about thirteen inches.

The jay is considered one of the most elegant birds indigenous to Great Britain. It inhabits wooded districts, living chiefly upon fruits. In consequence it becomes a sad enemy to the gardener, devouring all kinds of fruit, and committing great havoc upon the crops of peas, when in bearing. Smaller birds are not always safe from its attacks.

It builds its basket-like nest in trees or hedges,

laying five or six eggs, of a dull whitish olive, mottled with pale brown.

Even in a wild state the jay is the very prince of British mimics, imitating the sounds with which it happens to be most familiar, as the bleating of a lamb, the mewing of a cat, the cry of a hawk or buzzard, the hooting of an owl, the neighing of a horse, and such like sounds, with great accuracy. These imitations, Colonel Montague observes, are so exact, that he has been often deceived by them in the woods. But under careful instruction the imitations of this bird are perfectly wonderful. "We have heard one," says Bewick, in his History of British Birds, "imitate the sound made by the action of a saw so exactly, that though it was on a Sunday, we could hardly be persuaded that the person who kept it had not a carpenter at work in the house. Another, at the approach of cattle, had learned *to hound* a cur dog upon them, by whistling and calling upon him by his name: at last, during a severe frost, the dog was, by that means, excited to attack a cow in calf, when the poor animal fell on the ice, and was much hurt: the bird was complained of as a nuisance, and its owner was obliged to destroy it."

The STARLING is of a shining brassy black, spotted with little triangular spots of reddish-white; the lower coverts of the tail are bordered with white; the bill yellow; the legs brown; the length about eight inches.

These birds inhabit the old Continent, from Norway to very southern latitudes. Their general food consists of insects and their larvæ, snails, earth-worms, grain, seeds, and berries. In the Orkney islands

they are as common as sparrows elsewhere; flocks of them are to be seen perching on every wall and chimney top. In flight they are not undulatory, but smooth and even; they walk very nearly in the manner of a wagtail; but when they assemble in flocks their movements are noisy and tumultuous, describing, according to Buffon, a sort of vortex, combined with an advancing progress. They chatter much in the evening and morning, both when they assemble, and when they disperse. On the approach of birds of prey they rally in close array, and usually succeed in driving off the marauders.

The female makes an artless nest, in the hollow of old trees or walls, sometimes in cliffs overhanging the sea: she lays four or five eggs, of a pale greenish ash-colour.

Starlings are often domesticated, from their remarkable imitative talent: they are easily taught to whistle simple airs, to articulate certain sounds, and to repeat words.

BULFINCH AND NEST.

(Loxia vulgaris.)

The bulfinch, though somewhat clumsily built, must be pronounced a very handsome and choice bird. Its head, throat, wings, and tail are velvet-black, tinged with velvet purple; the nape of the neck and back bluish-grey; the cheeks, neck, breast, belly, and flanks, claret-red; the rump and lower parts white; the great wing-coverts are tipped and mar-

gined with pinkish white, forming a transverse bar across the wing; the bill and legs are dark brown; the length about six inches.

This prince of pipers is by no means uncommon, being very widely scattered. Cold and temperate climates seem best to suit it, though it is found almost throughout Europe, and in America. Northern Asia is likewise its cradle; but in Africa it is rarely to be met with, and never in New Holland.

The food of this bird, during the winter months at least, consists principally of pine and fir seeds, corn, and all sorts of berries. During the spring and early part of the summer, they feed upon those buds of trees which are pregnant with the leaves and flowers, especially of the apple, pear, peach, and other garden trees. Such trees are often so profusely stripped by these feathered rogues, that the crop is completely destroyed.

The architectural skill of the bulfinch is considerable, making a very neat nest. It sometimes builds in low thick bushes; but most commonly on the flat branch of a spruce pine or silver fir. In the latter case the architect lays a foundation of birch twigs, placed crossways in the forks of the branches, paying much attention to the security of the fabric. When the bird selects a spruce pine, finding that the flat branch itself is an excellent foundation, it uses a much smaller number of sticks. Having reared a ground-work to its mind, a quantity of flexible fibrous roots are collected, which the builder intertwines into a sort of basket-work, rather loose, and only just sufficient to hold the eggs and young from rolling down. The inside is wholly lined with fine roots,

usually without any hair or feathers. The eggs are generally four or five, of a bluish-white, speckled with pale orange. The young are generally hatched in May or June.

But the chief value of the bulfinch consists in its high capabilities as a songster, or rather, as a piper; some of them being able to whistle distinctly three different tunes, without spoiling or confusing them in the least. There is doubtless a great difference in the natural capabilities of these birds; one learning with ease and quickness, another with slowness and difficulty. Yet it is remarkable that those birds which learn with most difficulty, remember the songs, when once learnt better and longer, indeed rarely forgetting them. The attachment which bulfinches form for persons, is also most remarkable. Of this many well-attested facts might be given. Hundreds of bulfinches are yearly taught, and exported to foreign countries, by the German bird-sellers, their value varying from one to several pounds sterling. The male bulfinch will, in confinement pair with the hen-canary; but this is attained with some difficulty.

BIRDS OF PARADISE.

Although specimens of these birds are now common, yet is their history still but very imperfectly known. They were formerly procured chiefly from the Chinese, who, to enhance their value, always sold them to Europeans in a mutilated state, pretending

GREAT EMERALD BIRD OF PARADISE.

that they were of heavenly origin, lived upon some kind of nectar, and were without feet. These idle tales have in modern times been corrected by matter of fact. Travellers have of late years, often seen them alive in their native woods; and have introduced them amongst us in an unmutilated state. They form a large family, are of singular form, and many of them arrayed in plumage of transcendent brilliancy. Of this our readers will find ample proof in the numerous beautifully preserved specimens in the British Museum. Their habitat is New Guinea, and the Moluccas.

The characteristic marks of this family are as follow:—the bill of medium size, straight but compressed; the nostrils entirely concealed by the feathers; the legs short but strong; the tarsus, or thumb-like toe, longer than the middle toe; the back toe longer than the others; the sixth or seventh feather of the wing the longest. The largest of these birds, called by Linnæus *apoda*, from its supposed want of feet, is about two feet long; the smallest denominated *regia*, from five to seven inches.

These birds, it is believed, live in troops, and are not monogamous, a male bird being found with about fifteen females, which form his seraglio. They are seen on the tops of the highest trees, and make a loud and shrill cry, in a kind of musical gradation, *he, hi, ho, haw*, repeated rapidly and frequently. M. Lesson tells us, that when in the island of New Guinea, and in the woods for the purpose of shooting, a bird of paradise flew gracefully, and in an undulatory manner, by him; the feathers of its sides

forming an elegant and aërial plume, which, he thought, without exaggeration, bore no remote resemblance to a brilliant meteor. Such was the surprise, and high gratification of the traveller, that his eyes alone devoured this splendid bird, since he forgot that his gun was in his hand, until the bird had flown far away.

Travellers have remarked that the plumage of these birds is never out of order, or has the least soil upon it. Indeed it seems the business of their lives to give attention to the toilet. They wash twice every day, even in confinement, and comb and plume every feather separately with their bills. And as if fearful that their gay apparel should become bleached by the heat of a tropical sun, they take care to conceal themselves under the luxuriant foliage with which they are surrounded, during the hotter parts of the day, so that they are never seen but in the early part of the morning. They are sometimes to be met with at Macao, where they are kept in cages.

The birds of Paradise in the Moluccas are called *manucodewatas*, which signifies, the birds of God.

Of this splendid family our artist has selected three as illustrations, and of which we proceed to give a brief notice.

(1.) The Great Emerald, or *Paradisea apoda*. This bird has been the most often seen in a state of nature, and is perhaps the most elegant of the whole family. Still description is completely set at defiance by the vivid and changing tints of this magnificent inhabitant of the forest. The general plumage is cinnamon colour; the throat golden green:

THE HOOPOE.

trees, often in those which have been deserted by the woodpeckers. The female is a good sitter, though from timidity, she is easily driven from her nest, and when disturbed hisses at her enemy, like a snake.

The Hoopoe or Upupa Epops. This singular and beautiful bird can hardly be denominated British, since it visits Great Britain only very occasionally, and then only for a short time in the autumn of the year. It has usually been arranged among a species of foreign birds called *promerops;* but the correctness of this connexion is, at least, very doubtful. The hoopoe, remarks Baron La Fresnaye, from the shortness of its fore toes, the almost straight form of the claws, and particularly from the claw of the hind-toe, has evident affinities with the larks, and other conirostral ground birds.

The bill of the hoopoe is very long, and slightly arched; the nostrils are surrounded with feathers in front; it has three toes before, the exterior united with the middle one to the first joint, and one behind; the tail square, consisting of ten feathers. The head is adorned with two rows of reddish feathers, terminated with black, forming an arched tuft, which the bird has the power of elevating or depressing at pleasure; the body of an iron-brown colour; the wings black, with fine white bands; the tail black, with a lunated white band. Its length about a foot.

This bird is rare in England, but common in the south of France, where they arrive late in the spring, and depart towards the close of summer. In the neighbourhood of Bourdeaux, and on the banks

of the Garonne, are large tracts of marshy ground, where poplars and willows are planted, and among which insects very much abound. Such localities are favourite retreats of the hoopoes: they may frequently be seen examining the rotten and hollow parts of the trees for insects, where also they make their inartificial nests, consisting chiefly of dried grass. The number of eggs laid range in number from four to seven, and are of a pale lavender grey. The young are generally hatched towards the end of May. These birds are very much on the ground, their power of flight being inconsiderable.

Two young hoopoes, Beckstein tells us, taken from the top of an oak, were, with much care and attention reared. They soon became very familiar with their owner, climbing upon his person, perching on his shoulders, and even on his head. This attention was particularly manifested when a small pan with milk was produced, and with which they were fed. Cream was with them a favourite dish, which they would greedily swallow. They were also partial to beeties and may-bugs, first killing them, and then tossing them up in the air and catching them: they would, however, never touch an earth-worm. They became so tame that their owner was accustomed to take them into the fields, for the purpose of catching insects for themselves. In these excursions their great dread of birds of prey became very apparent. In such cases the hoopoes would crouch down upon the ground, covering themselves as much as possible with their wings, yet carefully watching the object of their alarm. No sooner had the bird which frightened them disappeared, than

they would immediately jump up, uttering the cry of "*vec, vec, vec,*" indicative of their joy. When excited they became somewhat clamorous; but the usual note of the male bird was little more than "*hoop, hoop.*"

Hoopoes are widely spread throughout Europe, and in Northern Africa. Varieties of this species are likewise to be found in Asia, central Africa, and India.

THE CREEPER AND NEST.

(Certhia familiaris.)

Of this species there are several varieties, though the specimen which we have selected be the only one known in Great Britain, where also it remains during the whole year. In some countries it is believed to be migratory.

The bill is about half-an-inch long, slender, and curved; the head and neck streaked with black and yellow-brown, with a white line over each eye; the back, wings, and tail a tawny brown, and a yellowish-white bar across the wing; the breast and belly silvery white; length about five inches.

The creeper is a most restless and active bird, ever on the move, climbing up and about the branches of trees in search of insects. From its extreme activity it is seldom seen, and hence but little known. It has a monotonous note or chirp, which it is ever repeating.

Our print will show the manner in which its simple nest is constructed, formed chiefly of dried grass and feathers, and placed in the hole of a decayed tree. The female is regularly fed by the male bird while sitting on her eggs, amounting in number to six or eight.

This bird is extensively scattered throughout Europe. It may be ranked also amongst the birds of the northern States of America.

HUMMING BIRDS.

THERE is as much truth as poetry in the exclamation of the Psalmist—"When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou hast ordained;—What is man?—Thou hast put all things under his feet:—the fowl of the air!"—Psalm viii., 3—8. While we admire the vastness and order of the Creator's works in the starry firmament, we are not less surprised at the wondrous display of his power in the formation of the more minute parts of his works. The marvellous variety of forms, colours, and tints, in that numerous but immaculate class of creatures called humming birds, excite alike our wonder and delight. The pen of the writer, and the pencil of the artist, are alike set at defiance, in the amazing brilliancy of colour in these beautiful, but minute tenants of the woods. The birds themselves, after death, present but a faint portraiture of what they were when alive; ever on the wing, fluttering from

HUMMING BIRDS

flower to flower, and from shrub to shrub; while, beneath the glare of a tropical sun, their magnificently splendid plumage is ever varying its tints, presenting in turns to the eye of the wondering beholder, the sparkling whiteness of the diamond, the burnished gold-colour of the topaz, the lustrous green of the emerald, the gorgeous azure of the sapphire, the rosy red of the amethyst, the transparent violet of the jacinth, and the combined splendour of the chalcedony.

The beauty of these birds can only be rightly appreciated when they are seen alive. "Those," observes Mr. Bullock, "who have seen these birds whilst living, displaying their moving crests, throats and tails, like the peacock in the sun, can never look with pleasure on their mutilated forms. I have," continues Mr. Bullock, "carefully preserved about two hundred specimens, in the best possible manner, yet they are still but the shadow of what they were in life. The reason is obvious; for the sides of the laminæ or fibres of each feather, being of a different colour from the surface, will change when seen in a front or oblique direction; and as each laminæ or fibre turns upon the axis of the quill, the least motion, when living, causes the feathers to change suddenly to the most opposite hues." The females are generally without the splendour of the males; and it is not till the third year that the young males shine out in the full radiance of their nuptial dress.

The number of species of the humming bird is still unknown. Mr. G. Loddiges, in 1842, possessed, it was said, one hundred and ninety-six species.

But the splendid case of humming birds belonging to our friend Mr. Leadbeater, and lately to be seen in the northern transept of the Great Exhibition, surpasses even this. The number of species in this collection exceeds two hundred, and are of transcendent brilliancy. Here, almost every conceivable form of bill may be noticed; some curved, others recurved; some very long, or straight, others sharp, or very short; every variety, likewise, of singular appendages may also be observed; frills, ruffs, crests, varied tails diversified in shape; others with feathered boots. This magnificent case of birds is valued at a *thousand guineas;* and may, unless already disposed of, be seen at Mr. Leadbeater's house, 19, Brewer-street, Golden-square. Mr. Gould's collection in the Regent's Park Gardens is, we believe, still more extensive, amounting to nearly, or quite, three hundred species. These, we trust, at the commencement of another season, will be free to public inspection; when we are sure they will excite that attention which they so well deserve.

The anatomy of the humming bird is peculiar; an examination of the skeleton will explain the cause of the rapid and varied motion of this bird. The deep keel of the breast-bone, the power of the bones of the wing, the lengthened scapula, or shoulder-bone, and the large pectoral muscles, all demonstrate an organization of the locomotive system, especially adapted to the development of the highest powers of flight. The long tongue of the humming bird is also remarkable.

Humming birds were certainly but little known,

HUMMING BIRDS.

if not quite unknown to the ancients. Soon after the discovery of the New World by the Spaniards, it was noticed that the radiant mantles worn by the natives in Montezuma's time, arose from the feathers of these diminutive birds. These birds abound in the warmer regions; and are dispersed over every part of America and its islands, and in almost every climate: for during the summer months they are found in Hudson's Bay and Canada. Captain Cook brought many fine specimens from Nootka Sound. One, the smallest species, less than some of the bees, is found in Jamaica, where Mr. Bullock observed one of them which had taken his station in a tamarind tree, and from which he furiously drove away every intruder, though more than ten times his own size.

Some diversity of opinion exists as to whether the humming birds are birds of song. In general they certainly are not; yet it is quite possible that among so large a family, some may possess the power of song, though in a subordinate degree. The humming which they make in flying, does not proceed from their voice, but is occasioned by the very quick vibratory motion of their wings.

From the length of the tongue in these birds it became commonly believed that they live chiefly on the honey or nectar obtained from flowers. This may be part of their food at particular seasons of the year; but from an examination of the stomachs of many of them after death, it is certain that they also feed upon the smaller beetles and flies. Travellers have noticed some of the smaller species busy in robbing, with considerable caution, the web of a spider, for

any small insect which might chance to have become entangled therein.

The nests of these lovely pigmies are no less curious and wonderful than themselves. They greatly vary, both in form and structure; but the tiny architects being aware of the small quantity of animal heat in themselves, seek the softest and most delicate materials for the construction of their nests. Cotton, thistle down, and fine fibre, are the principal articles employed. In Tobago, and other parts, the humming birds perform a migration, arriving about February, and leaving towards the beginning of August. The nests are usually of the basket form; but some construct suspensory nests, sometimes fastened at the end of a single twig, while others make them more secure by fastening them in more than one place. Some of the basket-nest builders have been noticed to make their nests higher, as the young increase in size. The period of incubation seems to vary from twelve or thirteen days, to twenty-one. During this season the birds become perfect furies if the neighbourhood of their domain be encroached upon. Their flight under excitement is swift as an arrow, accompanied with shrill piercing shrieks. They attack the eyes of the larger birds with their sharp needle-like bills, and which, in truth, are formidable weapons in this kind of warfare. . When intruded upon by one of their own species, a severe conflict becomes certain. With swollen throats, up-lifted crests, expanded wings and tail, the fight is continued, until one of the combatants falls exhausted on the ground. Such pugnacious audacity possibly led the

HUMMING BIRDS.

Mexicans to a belief that the diminutive bodies of these winged furies contained the souls of slain warriors.

It has been remarked that some species of humming birds, like bats, frequently in sleeping, suspend themselves by the feet, with their heads downwards.

Our artist has selected six specimens as illustrations, which we now proceed briefly to describe.

1. The TROCHILUS CORNUTUS, or HORNED HUMMING-BIRD. The bill and feet of this remarkable bird are very weak, and of a dark colour; two flattened fan-shaped crests, each of six feathers proceed from the forehead on a level with the eyes. The brilliancy of these crests surpasses all description, varying the hues of polished gold to red, then to blue, next to green, and again to the brightest yellow. The feathers of the forehead, sparkle with metallic green, changing to deep blue. The lower part of the belly is white; but the middle of the abdomen and the flanks are like the back, golden-green, mingled with grey towards the base of the feathers. The back and sides of the head, the rump, and the back, are metallic golden-green. The tail consists of ten feathers, of which four are longer than the rest, and are graduated and white, excepting the two middle, which are brown. The wings, though long, reach only to the half of the tail. The female bird has no crest, and her livery is less brilliant. The length of the bird a little more than four inches.

2. The TROCHILUS RECURVIROSTRIS, or RECURVED-BILL HUMMING-BIRD, known also as the ORNISMYA AVOCETTA. The general colour of this bird is golden-

green; the throat a shining emerald-green; the middle of the breast and body black; the lateral tail feathers short, but topazine beneath. But the distinguishing characteristic of this family is the *recurved*-bill, which is believed to be without parallel in any other land bird yet discovered. It is a native of Peru.

3. The ORNISMYA GOULDII, or GOULD'S HUMMING-BIRD. Mr. Loddiges, already referred to, was we believe the first person who possessed this singularly curious bird. It is found in Guiana, Brazil, and Trinidad. This gorgeously arrayed native of the woods possesses some marks in common with the large family of which it is a member, such as its short legs and long bill, alike of a dark colour; yet in other respects it is distinguished by a livery peculiarly its own. It has a pointed and erect tuft on the top of the head of a deep chesnut colour; the back is golden-green; a white stripe traverses the rump; the tail is of inordinate length, fanned and rounded, the two middle feathers of which are golden-green; the side feathers black; the wings are purple-brown; the front of the neck and upper part of the abdomen of a varied lustrous emerald-green, the still lower parts brownish-green; feathers disposed in a fan shape proceed from each side of the throat, the longest on the outside, and the shortest the most internal: these are all pure white, excepting at the end of each, which is encircled by deep green, with gold and emerald hues in the centre, somewhat resembling the tail of the peacock.

4. The TROCHILUS MOSCHITUS, or RUBY CRESTED HUMMING-BIRD, has small feathers about the bill

and head, which in one point of view appear to be light ruby, and in another purple. The plumage above is black, with green reflections. It is found in Cayenne and Brazil.

5. The TROCHILUS AMETHYSTINUS, or AMETHYST HUMMING-BIRD, is another singular variety, having the throat and front of the neck of a brilliant amethyst colour, changing according to the light in which it is seen, into a purpled-brown. Its habitat is Cayenne.

6. The last variety which we notice is the TROCHILUS CYANEUS or BLUE-GREEN HUMMING-BIRD, which, like all its compeers, is singular in form, and resplendent in colour.

THE BEE-EATER AND KINGFISHER.

THE family of birds now to be described is distinguished by the name of *syndactyle*, because their toes are joined; the outward toe to the second joint of the middle toe, and the inner toe to the first joint. In other respects birds arranged in this division very much differ among each other.

The COMMON BEE-EATER, or *Merops apiaster*, has a sharp-edged pointed bill, the nostrils much concealed by hairs, and directed forward. The forehead is greenish-white; the neck and back chestnut; the

body generally reddish-yellow; the middle part of the wing deep red; the wing and tail feathers olive-green; the throat golden-yellow; the two middle tail feathers being elongated. It must be pronounced a very handsome bird.

This bird is but an occasional visitor to Great Britain, and then only in the fall of the year. It is common throughout the warmer regions of Europe and Asia. The bee-eater is also found in Australia, but not in America.

These birds are gregarious, catching their prey when on the wing, after the manner of swallows, and which consists chiefly of bees, of which they destroy an immense number. In countries where they are common, they are often caught by a thread baited at the end with a flying insect secured by a small pin, the other end of the thread being kept in the hand. The poor bird catches at the insect, and with it swallows the pin, wherewith it is caught.

They make their nests in holes upon the banks of rivers.

The KINGFISHER (*Alcedo ispida*), with its varieties, is dispersed throughout the whole world, although but one species is found in Europe. The whole family is remarkable rather for brilliancy of colour, than elegance of shape. Their flight is strong and rapid. Most of them frequent the banks of rivers, and are expert fishers.

The European species, so well known in England, is the *alcyone* of the ancients, which the poets feigned as occupying a floating nest, and calming adverse winds and stormy seas. That entertaining liar, Ovid, tells the tale that, Alcyone having lost her husband

Ceyx, in a storm at sea, and going to the beach to lament her loss, at a distance she descried her husband's corpse; attempting to throw herself headlong into the sea, she was changed into a bird:—

"Then flick'ring to his pallid lips, she strove
To print a kiss, the last essay of love.
* * * * * * *
The gods their shapes to winter birds translate,
But both obnoxious to their former fate.
Their conjugal affection still is tried,
And still the mournful race is multiplied:
* * * *Alcyone* compress'd,
Seven days sits brooding on her floating nest."
(GARTH'S *Ovid's Metamorphoses*, book xi.)

The length of the kingfisher is about seven inches, the bill being two inches, and strong and straight. The upper mandible is black, fading into a reddish-orange, which is also the colour of the lower one. A broad stripe passes from the bill over the eye, to the hinder part of the neck, of a bright orange colour, margined with black; the throat is white; the head and wing-coverts of a brilliant green, spotted with light blue; the middle of the back and tail a resplendent blue; the under parts generally of a bright orange; the legs and toes being red.

Its food consists entirely of fish, on which it darts with unerring certainty, often remaining for several seconds under water, while it is gaining the object of its pursuit. On bringing up the fish it carries it to the land, beats it to death, and swallows it. The evolutions of the bird are quick as lightning, and in its short flight it passes on like a flaming meteor.

The artless nest is made in a hole by the water's edge, the entrance to it being often under water.

This, perhaps, exposes the young to much danger, not merely from floods, but the attacks of water-rats and other vermin. The eggs of the king-fisher are of a clear white, and usually six in number. Excepting in the breeding season, these birds are always seen alone. They are extremely shy, living in marshy and unfrequented places; yet, in a village near London, we recollect seeing a very fine male kingfisher brought into the room by a cat, which she had only just captured, the poor bird being still warm. Kingfishers are, we believe, nowhere very numerous.

THE HORNBILLS.

These birds, from the peculiar form of their feet, have been arranged with the birds just described, though, in other respects, they are so peculiar that they might seem to require a distinct place for themselves. They are widely scattered in the Old World, being found in Africa, India, and the Indian Archipelago.

The Rhinoceros Hornbill, or *Buceros Rhinoceros*, is about the size of a turkey-hen, but more slender. The bill is nearly a foot long, and furnished at the base of the upper mandible with an extremely large process, continued for a considerable space in a parallel direction with the bill, and then turned upwards in a contrary direction, like an inverted horn. Though such an organization may seem formidable, yet the bird is said to be quiet and unoffending. Its plumage is black, and the tail tipped with

THE GREEN WOODPECKER.

THE ROLLER.

white; the casque red above; the feet and claws grey.

They progress by hopping, not by walking; and notwithstanding the largeness of their feet, they usually perch during the night. Their food consists chiefly of wild fruits, but some of this family, if not all, have a great liking for animal food, and when in confinement seem to prefer a dead mouse to almost any food which can be offered them.

The Boat-like Hornbill, or *Buceros Cavatus*, differs but little from the bird already described. The prevailing colours are black and white, with a dirty straw colour on the neck; the bill dull yellow, inclining to red at the tip; the feet are black.

Of the general habits of the whole family little is known.

THE GREEN WOODPECKER AND COMMON CUCKOO.

The scansorial, or climbing birds are united by very slight affinities, though their feet are all *zygodactylic*, or yoke-toed, the outer toe being readily reversible, so that the foot presents two toes to the front, and two to the rear, both nearly of equal power. The extremes of this peculiar organization may be noticed in the woodpeckers and parrots, which though both belonging to the climbing family, yet climb very differently. The woodpecker is a

bark bird, creeping up the tree with great facility by its double crab feet, which adhere to the bole of the tree with considerable firmness, employing also the stiff feathers of the tail as a prop; acting upon the same principle as a painter's scaffold, of every day use in the streets, for cleaning or repairing windows high above the ground. The parrots, on the contrary, subsisting chiefly upon fruits, climb about among the smaller branches of the tree, in quest of their food.

Woodpeckers form an extensive family, the different species being numerous, and widely scattered over the colder, and more temperate parts of Europe, Asia, Africa, and America; although no woodpeckers have been found in Australia, or the South Sea Islands. Five or six varieties are known in England and Scotland of which the *green-woodpecker* is the largest, being about fifteen inches in length: the smallest *(picus minor,)* is little more than five inches long.

The green-woodpecker, although somewhat clumsily built and short-winged, is, notwithstanding, a handsomely coloured bird. Its bill is long, curved, and strong, being well adapted for catching insects in, or under, the bark of trees, or upon the ground. The tongue is also very long and horny, which the bird thrusts into ants' nests, and hereby securing both the ants and their eggs. A circle of red surrounds the eye, with an outer circle of white; the top of the head, and hinder part of the neck, are a bright crimson; the back and wing coverts are olive-green; the rump is yellow; the quill feathers and tail are black and white barred; the legs are greenish.

The eggs of this bird, usually five or six in num-

COMMON AND EGYPTIAN CUCKOOS.

ber, and of a greenish colour, are deposited in the hole of a rotten tree, almost without a nest. The young ones climb up and down the tree before they are able to take to the wing. Woodpeckers roost very early; but during the long days, the tapping which they make on the bark of trees, at an early hour of the morning, may be heard at a very long distance.

The CUCKOO, or CUCULUS CANORUS. A great number of species of this bird may be found in tropical climates, warmth seeming to be essential to their preservation, their skins being remarkably thin. The bill of the common cuckoo is wide at the base, but suddenly contracts, and is black but yellowish towards the base; the wings are long, reaching nearly to two-thirds the length of the tail; the feet are remarkably short; the head and upper part of the bird are of a dark ash-colour; the throat, under side of the neck, and breast, pale dun; the lower part of the breast and belly white.

Their food consists of fruits and insects, chiefly of those which are very soft.

Cuckoos arrive in this country early in the spring; and by the beginning of July, they have, for the most part, taken their departure. The most singular trait in these birds, is their habit of depositing their egg or eggs in the nest of other birds, such as the hedge-sparrow, the tit-lark, and others. The female bird, generally speaking, lays but one egg in a nest, and the young intruder, when hatched, has the extraordinary propensity of getting rid of the legitimate offspring of the owner of the nest by throwing them out of it Mr. Blackwall says, "I had taken much pains towards investigating the several phenomena

I had noticed in this bird, and was so fortunate as to have ocular proof of the fact, related by Dr. Jenner, of a young cuckoo turning out of a hedge-sparrow's nest, a young swallow I had put in for the purpose of experiment. I first saw the young cuckoo, when only a few days old, in the hedge sparrow's nest, in a garden close to a cottage, the owner of which assured me that the hedge-sparrow had four eggs when the cuckoo dropped in a fifth; that on the morning the young cuckoo was hatched, two young hedge-sparrows were also excluded; and that on his return from his work in the evening, nothing was left in the nest but the cuckoo. When five or six days old I took the young cuckoo to my house, when I frequently saw it throw out the young swallow for four or five days after. This singular action was performed by insinuating itself under the swallow, and with its rump forcing it out of the nest with a sort of jerk. Sometimes, indeed, it failed after much struggling, by reason of the strength of the swallow, which was nearly full feathered; but, after a small respite from the seeming fatigue, it renewed its efforts, and seemed continually restless till it had succeeded. At the end of the fifth day, this disposition ceased; and it suffered the swallow to remain in the nest unmolested."

Another observer, mentioned by Bewick in his history of birds, states, that when the cuckoo chances to lay two eggs in the same nest, a struggle always ensues between the two young cuckoos so soon as they are hatched, which ends in one of them being thrown out of the nest. It is further remarkable, that a cavity in the back of the youngster assists in

this work of expulsion; but which, after a few days, insensibly disappears. So wonderful are some of the laws of nature!

Strange as such a propensity may appear, it seems essentially necessary for the well-being of the intruder that the nest should be so cleared, otherwise it would be impossible for the foster-parents to supply the cravings of the gigantic nestling. So difficult is this task, that other birds of the same species have been known to render aid to birds so circumstanced.

The simple but monotonous notes of the cuckoo, whence it derives name, are too well known to require any exposition.

THE TROGON, MALE AND FEMALE.

(Calurus resplendens.)

This family of perching birds are remarkable for beauty of plumage. With the feathers of these birds we have been long acquainted, since the ancient Mexicans employed their long plumes as ornaments; and at a later period the Spaniards sent them over to Europe from time to time. With the entire bird, however, we have only recently become acquainted. The late Mr. George Canning, was, we believe, the first person who had a perfect specimen of the trogon, and which, after his decease, came into the hands of Mr. Leadbeater. Several fine specimens may now be seen in the British Museum.

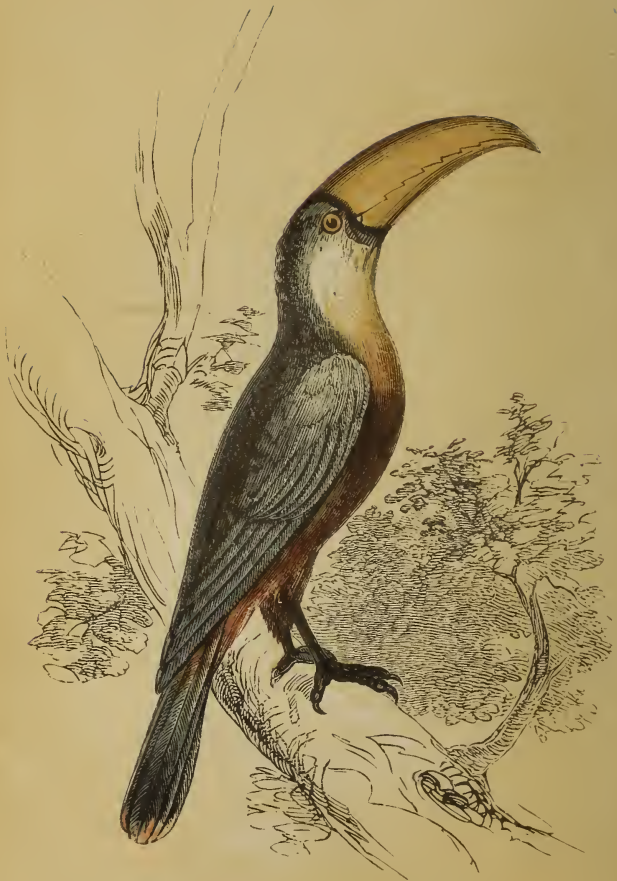
The rich dress of these birds might become fatally attractive; accordingly, the trogons, as if aware of the fact, are only to be found in the deepest and most

gloomy forests, far removed from the habitation of man. Though a rare bird, yet more than thirty different kinds are already known, natives of India, the Indian islands, Southern Africa, and Southern America.

Mr. Gould describes the *Calurus resplendens*, or *brilliant trogon*, thus: "bill, gamboge yellow; head covered with long plumes, forming a rounded crest; from the shoulders spring a number of lance-shaped feathers, which hang gracefully over the wings; from the rump are thrown out several pairs of narrow flowing plumes of great length—these plumes, together with the whole of the upper surface, throat, and chest, are of a most resplendent golden green the breast, belly, and vent, are of a rich crimson scarlet; the middle feathers of the tail black; the six outer ones white, for nearly their whole length, their bases being black; the feet are brown. Total length of the bird from the bill to the end of the tail, from twelve to fourteen inches; the length of the longest plumes more than three feet."

The plumage of the other varieties are in beauty but little inferior to that already described.

The habits of the whole family are much alike. They sit nearly motionless in a low branch of a tree, during almost the whole day. In the morning and evening they catch their prey, consisting chiefly of caterpillars, locusts, and beetles, darting upon them with a short and swift flight, returning, for the most part, to the station they had left. They build in the holes of trees, having usually four eggs, on which the female sits for twenty days. It is added, that the young take flight the moment they leave the egg-shell, and follow their parents.



THE TOUCAN.

(Ramphastos toco.)

Amongst the numerous ornithological wonders of the Brazils, the toucan must not be overlooked, the peculiar habitat of which is to be found on the banks of the Oronoco. The apparent disproportion of the bill of the toucan, is one of the innumerable instances of that beautiful adaptation of structure to use, which the book of nature everywhere reveals. The food of this bird consisting, principally, of the eggs and young of other birds, nature has given them the most exquisite powers of smell, towards which, the size of the bill appears to contribute.

The bill of these birds is cellular, nearly transparent, and serrated at the edges; the nostrils are vertical, and surrounded by a membrane; the tail is short.

The general plumage of the toco toucan is black, with the fore part of the neck and rump white; the vent red; the bill about eight inches in length, is reddish, with the tip black. The entire length of the bird is about twenty-seven inches.

Incubation takes place in the holes of trees, which are often made by the birds themselves. No bird better secures her young than the female toucan. If she perceives the approach of monkeys, her most formidable enemies, she will so settle herself in her nest as to put her strong bill out at the hole, and give the monkeys so warm a salute therewith, that they are glad to pack away in double-quick time.

In captivity the toucan appears a quiet unoffend-

ing bird; but in the event of a small bird being put into its cage, it instantly gives demonstrative proof of its carnivorous propensities, and its preference to flesh before a vegetable diet, seizing the bird, tearing it limb from limb, and voraciously devouring the same.

PARROTS.

Parrots form an extensive and interesting family of climbing birds. They are all yoke-toed, and possess powerful bills, varying a little from the peculiar nature of the food on which some of them live. They are also remarkable for the beauty of their plumage, and for their extraordinary capability of imitating the human voice. They inhabit all warm climates, chiefly in the torrid zone, and are found in high southern latitudes: throughout Tasmania, New Zealand, and Australia, they likewise abound. In their native climates they are the most numerous of the feathered tribes, flying in large flocks, uttering loud screams, and performing all kinds of evolutions in the air.

The whole genus is subdivided into the long and short-tailed kinds: the long-tailed being remarkable for having the two middle feathers of the tail longest, the rest shortening gradually on each side.

The Red and Blue Maccaw, or *Macrocercus Macao,* is one of the most splendid of the long-tailed kind: it is also one of the largest, measuring three feet in length, of which the tail is full two feet. Its

THE GREY PARROT.

plumage on the body is brilliant red; the wings deep blue; the tail blue, crimson, and purple-red; the cheeks, which in most maccaws are naked, are in this species clustered with small crimson feathers.

The Rose-winged Parrakeet, or *Palæornis torquatus*, is a very handsome bird, the middle tail feathers being much longer than the rest. The body is of a bright emerald colour, with the neck encircled with rose colour. It is found chiefly in Ceylon, but is widely scattered, being found even on the western coast of Africa, near Senegal. This species is believed to be the *popinjay*, so celebrated in the sports of our ancestors, and referred to by Shakspeare.

The Cockatoos form another branch of this beautiful family. They are chiefly natives of the Molucca Islands, though they are also found in flocks on the banks of the rivers of New South Wales. They are principally distinguished from others of the parrot tribe by a crest or tuft of feathers on the head, which the bird has the power of raising or depressing at pleasure. Like its congeners, it is very clamorous. In common with other parrots, its nest consists of vegetable mould only, formed by the decayed parts in the hole of a tree. The specimen selected by our artist for illustration, is the Sulphur-crested Cockatoo, or *Plyctolophus galeritus*, a very handsome bird, being pure white, with a yellow crest.

The Grey Parrot, or *Psittacus erythacus*. This variety is a native of Africa, its general plumage being ash-grey, inclining to white below; the tail crimson; the bill black. Its length is about a foot. This well-known bird is remarkable for its docility. It is also very long-lived, M. Vaillant mentioning

one as having lived at Amsterdam for seventy-three years after its arrival in Europe. This species excels all others for its loquacity, and the distinctness of its articulation, readily imitating every sound within its hearing. Many wonderful stories are told of this bird. Locke, in his *Essay on the Human Understanding*, relates an anecdote of an old parrot which Prince Maurice saw in Brazil. Several persons being in the room with the prince, the bird exclaimed, "What a company of white men are here!" The parrot was asked, "Who is that man?" (pointing to the prince.) The bird answered, "Some general or other." The prince asked the parrot, "From what place do you come?" The bird replied, "From Marignan." The prince enquired, "To whom do you belong?" It answered, "To a Portuguese." He asked again, "What do you do here?" The bird answered, "I look after the chickens!" The prince laughing, exclaimed, "You look after the chickens!" The parrot in answer, said, "Yes, I; and I know well enough how to do it!" clacking at the same time in imitation of the noise made by the hen to call together her young chickens. Willoughby, the naturalist, tells us of a parrot, which, when a person said to it, "Laugh, Poll, laugh," laughed accordingly; and the instant after, screamed out, "What a fool to make me laugh!"

All these birds, and other varieties, may be seen in the Zoological Gardens, Regent's Park.

CASSOWARY

THE CRESTED CURASSOW

THE CRESTED CURASSOW.

(Crax Alector.)

Many birds of the gallinaceous kind seem to have forgotten their native wilds, to place themselves under the special protection of man; subsisting upon the pickings of the farm-yard, the stable, and the dung-hill. Others, as the partridge and the pheasant, are found only in cultivated places, near the habitations of man, and if not subject to his control, are at least the objects of his care and pursuit. Others take shelter in the woods, or range over wild and heathy mountains. They are distinguished for delicacy of flesh, bulkiness of body, shortness of bill, and incapacity for lengthened flights. Their legs are strong; they are extremely prolific; and their nests for the most part, built on the ground, so that their young broods can follow the mother the moment they are hatched. Most of this order are polygamous.

The crested curassow is found in great numbers in Mexico, Guiana, and Brazil. It is easily domesticated, and its size nearly that of a turkey. Although found in flocks, yet curassows take the wing with great difficulty: they may, in fact, be called the pheasants of South America. The plumage is a deep black colour, glossed with green; beneath is of a dull white colour. The head is surmounted with a curled crest, from two to three inches in length.

The tail of all the species is somewhat long and broad. Like poultry generally, they roost, by night, on trees.

THE PEACOCK.

IN HEB. *Tukeeyim.*—(Pavo Cristatus.)—IN ENG. *Persian-birds.*

"*Every three years once came the ships of Tarshish bringing gold, and silver, ivory, and apes, and* PEACOCKS." 2 CHRON. ix., 21.

THAT the peacock was known in Greece, and had spread throughout Europe, in the time of Alexander the Great, is certain. Aristotle speaks of the bird as well known: when noticing the qualities of certain animals, he says, "Some are jealous and vain, like the peacock." Bochart has shown, that the Hebrew word in the text above quoted, means *peacocks*, a rendering which is justified by the Chaldee, Syriac, Arabic, and Latin versions; and is so understood by the learned rabbis. These birds, were doubtless, originally from India, in which country they are still indigenous. Colonel Sykes describes the birds as in a wild state in the dense woods of the Ghauts, in the Mahratta country, and as being identical with the domesticated fowls of Europe, male and female. "I speak within bounds," says Colonel Williamson, in his account of peacock shooting in India, "when I assert that there could not be less than twelve or fifteen hundred pea-fowls, of various sizes, within sight of the spot where I stood for nearly an hour." From India they seem to have been brought into Persia, and so

THE PEACOCK

became gradually dispersed through Judea, Egypt, Greece, and Europe. Parkhurst, the lexicographer, well remarks, "Let any one attentively survey the peacock in all the glorious display of the prismatic colours of his train, and he will not be surprised that Solomon's mariners, who cannot be supposed ignorant of their master's taste for *Natural History*, should bring some of these wonderful birds from their southern expedition."

> "The PEACOCK view, still exquisitely fair,
> When clouds forsake, and winds invest the air;
> His gems now brightened by a noontide ray;
> He proudly waves his feathers to the day.
> A strut, majestically slow, assumes,
> And glories in the beauty of his plumes."
>
> DEVEN'S *Paraphrase of Job.*

The bill of the peacock is convex, rather stout, curved and smooth at the base; cheeks partially naked; nostrils open; head plumed, and surmounted with an aigrette-like crest; the sixth quill longest; tail feathers eighteen; tail coverts, or *train*, very long, large, and, in the male, extensible. The head is surmounted by an aigrette of four-and-twenty upright feathers. In the males the tail coverts consist of feathers with loose barbs, and of unequal size, the upper ones shortest, each terminated by numerous eyes or circlets of beautiful iridescent brilliancy: these the bird has the power of erecting into a circle, and which presents, when the sun shines upon it, an object of dazzling splendour which sets all description at defiance. This train is often spoken of as the tail: this, however, is quite a mistake; the feathers of the train, not growing from the *uropygium*, or rump,

but all up the back. When the train is erect, nothing appears of the bird before but its head and neck. By a strong muscular vibration, these birds can make the shafts of their long feathers clatter like the swords of a sword-dancer. The head, throat, neck, and breast are of a deep blue, glossed with green and gold; the back of the same tinged with bronze; the scapulars, and lesser wing coverts are of a reddish-cream colour, variegated with black. The middle coverts deep blue, glossed with green and gold; the bill and vent are black. The train, however, is the glory of this bird, forming a fan of the most resplendent hues—yellow, gilded with various shades, green running into blue and bright violet, varying according to its different positions; the whole train receiving additional lustre from the colour of the centre, which is a fine velvet black. The female has the aigrette, but her general colouring is of a very sombre hue. It is, however, remarkable, that the females of this species, like the pheasant, sometimes, when they have done laying, assume the gay plumage of the male. We remember to have seen a bird of this kind in the Leverian Museum, Blackfriars-road. White peacocks are not at all uncommon in England, forming a singular variety.

Pea-fowls are rather tender; yet with care are not difficult to rear. There may be a great difference in different females as to their care of the young; but, we believe that, if the mother after hatching her brood is kept cooped for some time, the young ones would thrive nearly as well as the common chickens. When at large, the females being very restless birds, often lead their young into difficult places, when they

COMMON PHEASANT.

often become exhausted, and perish from their fatigue. These birds, both males and females, if not carefully housed towards the evening, will roost in the branches of the tallest trees, or even on the ridge of barns, however high, and other buildings. Though heavy birds, they take wing with considerable facility, but are unequal to long flights.

The hen birds, in common with other poultry, will, if possible, make their nests in some secret spot, for fear, it is said, of the male breaking her eggs. We doubt, however, the correctness of this latter statement. The eggs laid are usually five or six in number, and are sat upon from twenty-five to thirty days, according to the temperature of the climate, and the warmth of the season. Sometimes the female will sit twice; but the early hatched birds are always the finest and strongest.

If the peacock possesses the garb of an ANGEL, it certainly has the voice of a DEVIL.

PHEASANTS.

PHEASANTS form a class of birds never so well known as at present. Many beautiful varieties may be seen in the Zoological Gardens, Regent's Park. We are informed, that the Zoological Society have been so successful in rearing these brilliant and choice birds, that more than three hundred gold and silver pheasants were bred by them during a single season.

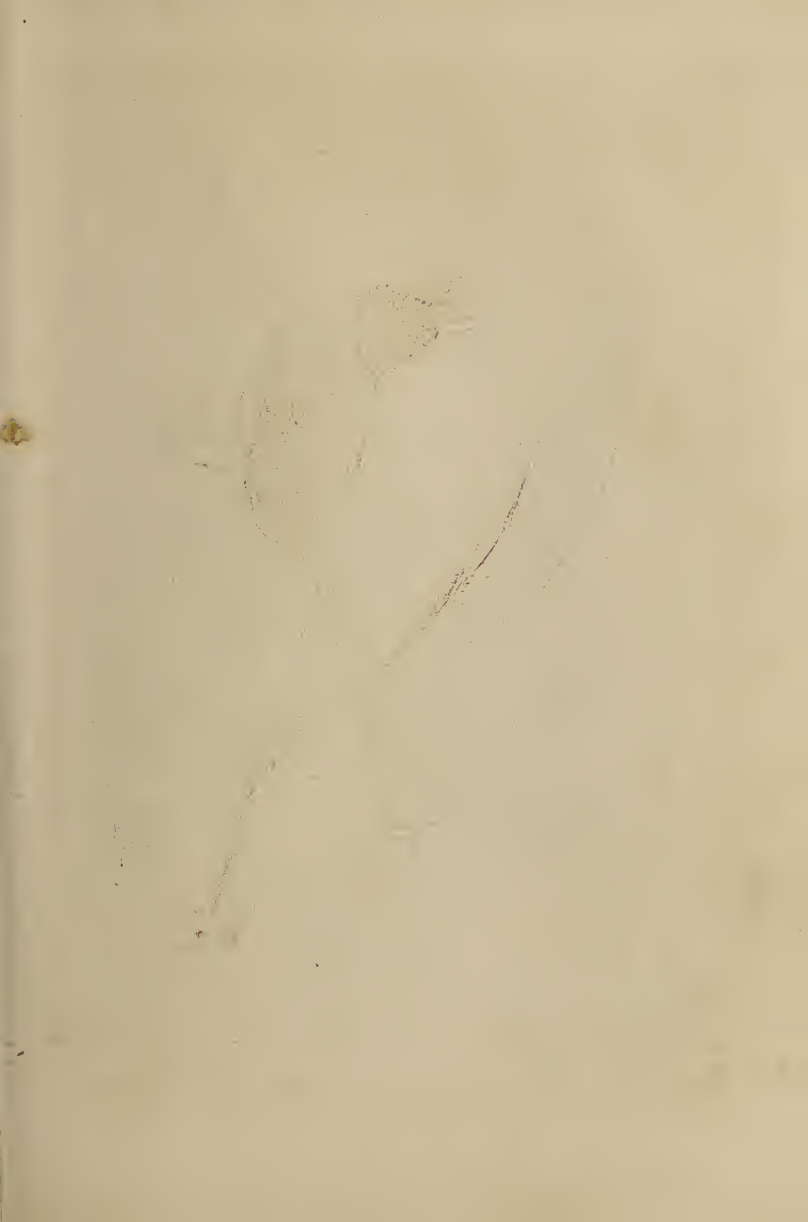
The PHASIANUS COLCHICUS, or COMMON PHEASANT, with the protection which the law of Great Britain

affords, is by no means a rare bird, on the contrary, it is not only widely scattered throughout our own country, but spread over the whole of temperate Europe, and the greater part of the old continent. If tradition is to be believed, this bird received its name from Phasis, a river of Colchis, in Asia Minor, and was brought into Europe in the renowned ship, Argo, under the command of Jason. The pheasant being famous for its delicate flavour, no less than for beauty of plumage, knights were accustomed to regard it, as "the nutriment of lovers, and the viand of worthies."

The pheasant ranks amongst the handsomest of our birds. In size it is somewhat less than the common cock; the bill is of a pale horn colour; the eyes are yellow, and surrounded by a space like fine scarlet cloth spotted with black; the upper part of the head and neck of a deep purple, varying to glossy green and blue; the lower part of the neck and breast of a reddish-chestnut; the belly and vent are dusky; the back and scapulars beautifully varied with black and white, mixed with deep orange; the wing coverts are brown, glossed with green, and edged with white; the two middle feathers of the tail much longer than the rest, and of a reddish-brown, varied with black; the legs are dusky. The hen is but a plain bird, and less than the male.

Pheasants are very shy birds, and never associate together, excepting during the season of love. The hen breeds on the ground, laying from twelve to fifteen eggs. The young follow their mother so soon as hatched.

The varieties of the pheasant family are very nu-



GOLDEN AND SILVER PHEASANT.

merous, and some of them of most splendid plumage; amongst which number the GOLDEN PHEASANT, or *Phasianus pictus*, holds the first place. This bird is a native of China, and the male bird, when in full plumage, is about three feet in length, of which the tail forms two-thirds. From the head rise long, fine, and bright yellow feathers, which hang gracefully over the hinder parts, which, with the sides of the neck, are orange and black. A golden tinge pervades the back of the neck, on a green variegated ground. The feathers of the back are bright yellow, bordered with crimson, while a deep blue surmounts the base of the wings, which are themselves beautifully varied with chestnut, brown, and red. The feathers of the tail are chestnut and black, and above its base bright scarlet, which is also the colour of all the under parts excepting the neck, which is dusky-brown. The iris, bill, and legs are bright colours. Such a combination of beautiful colouring must be designed to answer some useful purpose in the economy of these birds, of which we are still strangers.

The female is much smaller than the male, her tail shorter, and the plumage altogether more sombre. The work of incubation does not differ from that of other birds of the same species. The young are extremely delicate, and their native brilliancy of plumage is rarely long preserved in colder climates than their own.

Another handsome variety is the SILVER PHEASANT, or *Phasianus nycthemerus*. This bird is also a native of China, but of the northern provinces; hence it is more hardy than the preceding species, and may be made domestic with nearly as little care as the

common fowl. It is also less in length than the golden pheasant by about four inches. The cheeks, like the common pheasant, are bright red; the top of the head has long black feathers, falling backward. The back, wings, and upper part of the tail, are of silvery white, pencilled with black; the under parts are purplish-black. It has two long tail feathers of pure white; the bill is dusky-yellow; and the legs deep red. It is remarkable how well the splendid colours of such gay plumage harmonise, and how careful the birds are in well arranging their beautiful apparel, spending a large portion of their time in preeing their plumes.

These and other varieties may be seen alive in the Regent's-park gardens, or preserved specimens in the British Museum.

THE TURKEY.

(Meleagris gallopavo.)

To America we are, no doubt, indebted for this fine bird, which is now spread almost throughout the world in a domesticated state. It is still to be found in its native wilds, though the rapid increase of the population of America seems to threaten its extirpation. The range of these birds extends from the north-western territory of the United States to the Isthmus of Darien. The wooded tracts of Arkansas, Louisiana, Tenessee, Alabama, Kentucky, Indiana, and Illinois, form their great nursery. The North American ornithology informs us that, in a

wild state, the male birds associate together in large parties, seeking their food apart from the females, which, in their turn, form groups of their own sex and their young. All parties, though disunited, travel in the same direction, and on foot, unless the hunters compel them to take wing. They feed on maize, berries, fruits, grasses, beetles, lizards, and other vermin. They are fond of the pecan-nut, and acorns, which they find in great abundance in the valleys of the Ohio and the Mississippi. They reach such localities about October, which the Indians call the turkey-month. Thus they pass the autumn and winter, becoming comparatively familiar. The pairing time is in March, when the sexes roost apart, but at no great distance; the females, when uttering a call, may be heard by the males, every one of which within hearing will respond. Where turkeys are numerous, these sounds may be heard for hundreds of miles together. This continues for about an hour, and on the rising of the sun, when the birds descend to the ground, the males go singly, strutting and puffing, in search of the females. Should the males encounter each other during these ceremonious approaches desperate, and often fatal battles ensue. Such victories, however, seem to induce one or more of the females to follow the conqueror, which roost with him until they begin to lay. They then again separate, lest the male should break their eggs, which the males are ever inclined to do. The nest consists of a few dry leaves, placed on the ground, where from fifteen to twenty eggs, of a whitish colour, spotted with brown, are laid. The parental care which the female takes of her young brood is

remarkable, protecting them, at all hazards, from every enemy with which they may have to cope, but especially from the spite of the male birds, which would, without such protection, inevitably destroy them.

The turkey, in a domesticated state, is found of all colours; white is far from uncommon; buff is more rare. The darker birds are the most hardy, and birds hatched early in the spring are easily reared: a brood hatched after Midsummer is almost sure to droop and die, unless brought up within doors.

The Pintado Guinea Hen, or *Numidia meleagris*, is a restless, clamorous, but pretty bird. Its note is harsh and croaking; and if disturbed at night, will alarm the whole neighbourhood by its incessant and piercing cries. It was originally brought from Africa; but is now diffused throughout Europe, the West Indies, and America. It is rather a tender bird.

In size the pintado is somewhat larger than the common hen, and the sex not easily to be distinguished. The head is covered with a naked skin of blueish colour; the upper part of the neck very thinly furnished with feathers; the general colour of the plumage is a dark blueish-grey, sprinkled with pearl-like spots; its wings are short, and though heavy in flight, yet if left at liberty, will roost in the loftiest trees; the feet are nearly black.

The female lays a great number of eggs, which she loves to secrete till she has produced her young brood: the egg is smaller than that of a hen but of superior flavour. The pintado is but a careless nurse, and will require cooping if a good brood is desired.

DOMESTIC FOWLS.

THE COCK.

In Greek, *Alector*.—(Phasianus Gallus.)—In Eng. *Bed-rouser*

"*Jesus said unto him, Verily I say unto thee, that this night, before the* cock *crow thou shalt deny me thrice.*"—Matthew, xxvi., 34.

No class of birds is so useful to man as those of the gallinaceous kind, especially the common poultry. By a wise arrangement of Providence, they seem to have quitted their original wild state, depending upon man for their support, adorning our farm-yards and fields, while they live; and affording us a delicate, wholesome, and nutritious food, when dead. Birds of this kind are extremely prolific; and the young being hardy, are reared almost without trouble. The hen is a very model of mothers.

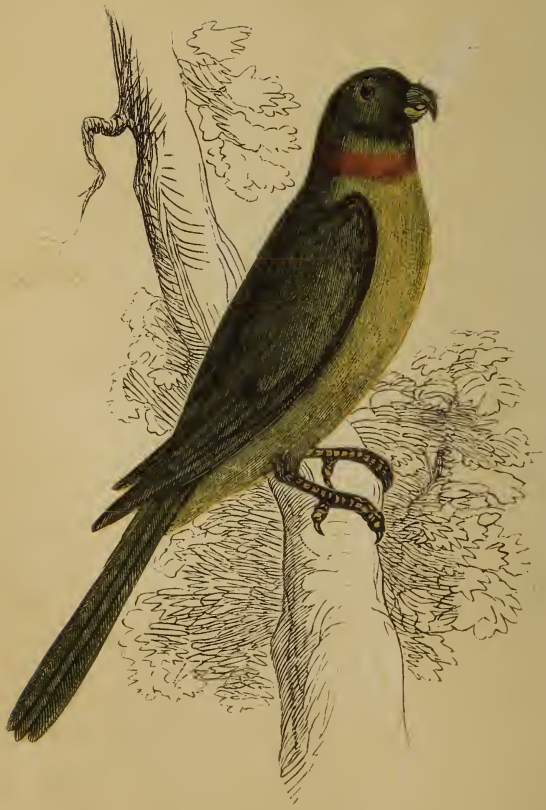
Fowls in their present domesticated state differ so much from their originally wild state, that it is difficult to trace them to their primitive stock. The jungle fowl is still to be found wild in India, and the islands of the Indian Seas. The domesticated varieties, both for size and colour, are almost endless, every district, of every country, having produced a different kind: the hybrids, also, have contributed to increase the variety. From Asia, their probable cradle, these birds have been diffused over every part of the world, America and Australia not excepted.

Of all the male birds of this species, for size, beauty, and courage, the first place must be assigned to the English Game Cock; perhaps second to him, though of dimunitive size, is the Bantam Cock, so

spirited that it will fight with birds much larger and stronger than itself.

The game cock, when in full plumage and undomesticated, is a very beautiful and animated bird. The head is small, but adorned with a beautiful red comb and wattles; the eyes sparkling with fire, and the whole demeanour bespeaking boldness and freedom. The feathers of the neck are long, falling gracefully down upon the body, which is compactly made; the tail is long and arched, giving grace to all its movements; the legs are strong, and armed with sharp spurs, with which he attacks his adversary with the fury of a dragon: he allows, when surrounded by his females, no competitor, being ever ready for combat, and either drives his rival from the field, or perishes himself. He is, moreover, most attentive to every member of his seraglio, leading, defending, and cherishing them, never eating until he sees them feeding around him. The unmanly practice of cock-fighting, to which this noble bird was sacrificed, has much declined, especially in our universities, where it formerly prevailed to a great extent.

The hen is a great layer: two eggs in three days, and that during the whole year, the moulting time only excepted, not being uncommon. A sitting hen exhibits the most anxious solicitude; covering her eggs with her wings, turning them daily, and forgetting almost her necessary supply of food to complete the growth of the incipient beings, still in the shell. As the period for hatching advances, she becomes still more attentive, leaving her nest with great reluctance, and then only for a very short time.



The Dorking fowls, we believe, amidst the great variety which exists, are preferred for the table.

The process of hatching chickens by artificial heat has been known and practised for ages, especially in Egypt. Attempts have lately been made to introduce this practice into our own country, and not without success. This curious process may now be seen daily in Leicester-square, London.

PARTRIDGES.

In Hebrew, *Phorai.* In English, *The Clatterer.*

"*For the king of Israel is come out to seek a flea, as when one doth hunt a* PARTRIDGE *in the mountains.*"—1 Samuel, xxvi., 20.

The Common Partridge, or *Tetrao perdix,* is one of the smallest of a very numerous family, of which the Wood Grouse, or Cock of the Wood, is the largest.

Partridges are so well known, that a description is scarcely necessary. They are about thirteen inches long, and the general colour of the plumage brown and ash mixed with black; the tail is short, and legs greenish. On the breast of the male bird there is a crescent of a deep chestnut colour; between the eye and ear, in old birds, there is also a naked skin of bright scarlet. Partridges, though widely scattered in the world, are, nevertheless, confined to temperate climates, where they are very prolific. Their nests are made on the ground, of dry leaves, and have broods from fourteen to twenty. Their favourite food is ants' eggs, on which the young will feed the mo-

ment that they leave the shell. They likewise eat insects and all kinds of grain.

When disturbed with their young, the male bird gives the alarm, uttering a peculiar cry of distress, throwing himself into the more apparent way of danger, to give the female and their young an opportunity of escape in an opposite direction. When the danger is supposed to be passed, the mother speedily returns through the grass, collecting her scattered family as she proceeds, which usually do not go far, but remain squatted among the grass.

The red and white grouse are varieties of the partridge family, but are found in colder countries. Scotland abounds with them.

The Wood Grouse, or Cock of the Wood, is a large and beautiful bird, nearly the size of a turkey, weighing from twelve to fifteen pounds, and about two feet nine inches in length. The bill is convex, but very strong, and of a horn colour; over each eye is a naked skin of a bright red colour; the head and neck are elegantly marked by black and grey lines, as are also the back and wings; the breast is black, glossed with green; the feathers of the tail are black. The female is much smaller than the male, and differs greatly in colour.

This splendid bird is rare in Great Britain, but is occasionally met with in the north of Scotland. In Russia, Sweden, and other northern countries, it is very common, living chiefly on the cones of the fir trees, plants, and berries. As the pairing season advances in the spring of the year, the male birds utter a peculiar cry, which has been compared to the whetting of a scythe, and which never fails to draw around

THE QUAIL.

them their faithful mates. The females lay from eight to sixteen eggs, of a whitish colour, spotted with yellow.

THE QUAIL.

In Heb. *Selav.*—(Tetrao coturnix.)—In Eng. *The Quiet-one.*

"*The people asked, and he brought* QUAILS, *and satisfied them with the bread of heaven.*"—Psalm cv., 40.

Quails are only about half the size of partridges, and greatly resemble them in shape and colour. They are widely diffused throughout Europe, Asia, and Africa. However numerous in other localities, quails are by no means numerous in Great Britain. They breed in this country, and some of them remain with us during the whole year, only changing their locality from the interior to the sea-coast. By what law they are governed in these matters we know not. About the autumn of the year such immense numbers have appeared on the western coasts of the kingdom of Naples, that a hundred thousand have been taken in a day, within the space of four or five miles. In the process of incubation they also resemble the partridge.

It seems highly probable that the quails which supplied the Israelites with food, during their journey through the wilderness, were sent thither, on their passage to the north, by a wind from the south-west, sweeping over Egypt and Ethiopia, towards the shores of the Red Sea. See Exodus xvi. 13; and Numbers xi. 31–2.

PIGEONS

In Hebrew, *Joneh.* In English. *Beauty.*

"*And if she be not able to bring a lamb, then she shall bring* two turtles, *or* two young pigeons; *the one for the burnt offering, and the other for a sin offering.*"—Leviticus, xii., 8.

In the great economy of nature, beasts and birds, equally with mankind, find it necessary to accomodate themselves to circumstances. In large and uncultivated countries, where extensive pastures and woods are everywhere to be found, the abodes of man may be shunned, and native liberty preserved; but as the same countries become more and more peopled, animals seek the protection of man, partially relinquishing their liberty for the sake of a secure homestead. The numerous family of pigeons will illustrate this. In a country like our own, wild pigeons are comparative rarities, while dove-cotes everywhere abound. Pigeons love their chains, and once inured to a locality, nothing will sever them from it. Accidental circumstances, of different kinds, may for a time draw them away, but no sooner are they freed from restraint, than they naturally return to their accustomed homes. They roam about, it is true, for their amusement, or in search, at particular seasons, of some favourite food; yet the place of their birth is never forgotten. This is perceptible in pigeons of every kind, but is specially developed in the carrier-pigeon, which, from the earliest periods of time, has been remarkable for its extraordinary sagacity in finding its home, though hun-

WILD AND CARRIER PIGEON.

dreds of miles from it. Hence the practice of employing these birds to convey intelligence from a distance. The crusaders are known to have employed them during the crusade of St. Louis, or Louis IX. of France. Tasso likewise, in his poem of *Jerusalem Delivered*, sings of a carrier pigeon which, in the execution of this duty was attacked by a falcon, and defended by Godfrey, who taking the letter from the persecuted messenger, was put in possession of all the secrets. The practice is still common in foreign countries; and even in our own country, notwithstanding the marvellous invention of the electric telegraph, the services of the carrier pigeon is still continued in connexion with the race-course, the prize-ring, and the stock-exchange.

This power of flight in almost every species of pigeons, enables them to perform very distant journeys. They are to be found in almost every climate, succeeding well, even in very northern latitudes. Pigeons must be pronounced to be beautiful and elegant birds, naturally gentle and lively, fond of society, yet the very emblem of connubial attachment and fidelity. They are all remarkably prolific.

To enumerate the numerous varieties of pigeons, as tumblers, carriers, jacobites, croppers, powters, runts, baldheads, turbits, shakers, smiters, owls, nuns, fan-tails, and others, would be quite foreign to our purpose; we must confine ourselves to a brief account of two or three varieties.

The Wild Pigeon, or *Columba œnas*. This bird may be regarded as the species whence all the domestic varieties are derived. It is about fourteen inches in length; the bill pale red; the head, neck,

and upper part of the back of a deep blue-grey; the breast of a vinous colour; the lower part of the back, belly, and tail coverts, are ash-colour; the legs are red, and the claws black.

Wild pigeons, though partially migratory, yet numbers of them permanently remain in this country, changing their locality for procuring food. In a state of nature, they build their nests in the hollow of trees, and commonly have but two broods in a season; when domesticated they will breed eight or nine times in a year. The male and female alternately perform the work of incubation. The food which they give the young is first swallowed, and while in the gizzard becomes macerated, and mixed with a kind of milk, which, in truth, very nearly resembles what is secreted from the *mammæ*, or breasts of mammals. This fact possibly gave rise to the notion of pigeons' milk.

The Migratory, or Passenger Pigeon (*Columba migratoria*). This bird is of the same size as the last-described, namely, fourteen inches in length. The tail is of an ash-colour; the neck yellowish-purple, inclining to green; the wings have ovate spots on the middle; the breast is rufous, and the abdomen white. Its habitat is North America.

Passenger pigeons are found in immense flocks, which in their excursions sometimes cover a space of two miles in length, and a quarter of a mile in breadth. They travel in the morning and evening, reposing about noon in the forests, especially in those which abound in oaks, of the acorns of which they are very fond. Although they always shape their course in the same direction, they seldom

observe the same line of march for two seasons in succession, proceeding sometimes by the maritime, and sometimes by the more inland regions. Their passage, whether in spring or autumn, lasts from fifteen to twenty days, after which they are met with in the centre of the United States. In the states of Ohio, Kentucky, and Indiana, their breeding places are made in the back woods, and often extend nearly in a straight line across the country for a great way. "Not far from Shelbyville," says Mr. Wilson, the American ornithologist, "in the state of Kentucky, there was one of these breeding places, which stretched through the woods for several miles in breadth, and was said to be forty miles in extent. In this tract almost every tree was furnished with nests, wherever the branches could accommodate them. The pigeons made their first appearance there about the 10th of April, and left it altogether, with their young, before the 25th of May. When the young were fully grown, and before they left the nest, numerous parties of the inhabitants from all parts of the adjacent country, came with waggons, axes, beds, cooking utensils, &c., and encamped for several days at this immense nursery. The noise was so great that the horses were terrified by it, and it was difficult for one person to hear another speak but by bawling in his ear. The ground was strewed with broken limbs of trees, eggs, and squab-pigeons, which had been precipitated from above, and on which herds of hogs were feasting. Hawks, buzzards, and eagles, were sailing about in great numbers, and seizing the squabs from the nests at pleasure, while from twenty feet upwards, to the top of the trees, the view through

the wood presented a perpetual tumult of crowding and fluttering multitudes of pigeons, their wings roaring like thunder, mingled with the frequent crash of falling timber, for now the axe-men were at work, cutting down those trees that seemed to be most crowded with nests, and contrived to fell them in such a manner, that in their descent they might bring down several others; by which means the falling of one large tree sometimes produced 200 squabs. It was dangerous to walk under these flying and fluttering millions, from the frequent fall of large branches, broken down by the multitudes above, and which in their descent often destroyed a number of the birds themselves; while the clothes of those engaged in traversing the roads were completely covered with the excrement of the pigeons." Mr. Wilson believes that a flock of pigeons which passed for hours together, above gun-shot, but distinctly in sight, must have extended to a length of 240 miles; and that the numbers composing it, must have amounted to 2,230,272,000 pigeons. He adds, that allowing each pigeon only half-a-pint of food daily, this vast family would require 17,424,000 bushels daily. These statements, extraordinary as they may appear, are confirmed by Mr. Audubon, the ornithologist, who had the finest opportunities of testing their truth.

THE TURTLE DOVE.

In Heb. *Tur.*—(Columba turtur.)—In Eng. *The Orderly-one.*

"*O deliver not the soul of thy* Turtle-dove *unto the multitude of the wicked.*"—Psalm lxxiv., 19.

This beautiful variety is about a fourth-part smaller than those already described. Its head, neck, breast, and back, are light-brown, tinged with grey; a patch of black feathers, margined with white, are on each side of the neck; the wing black and bluish-grey; the under parts white; the tail feathers brown and white.

The plaintive cooing of these birds, when in confinement, is almost proverbial, and they have the credit of being remarkably faithful to their connubial engagements. In a wild state, this delicate bird is only a periodical visitant in Great Britain, arriving about the beginning of May, and departing after incubation, at the commencement of September. Turtle-doves are found in most warm countries, where they are also extremely prolific. They are several times mentioned in the Holy Scriptures.

The turtle is mentioned among migratory birds by Jeremiah, viii., 7, and this differs from the rest of its family, which are all stationary. Solomon, Canticles, ii., 12, notices the return of this bird as one of the indications of spring:—"The voice of the turtle is heard in our land."

THE OSTRICH.

IN HEB. *Yeainah.*—(Struthio Camelus.)—IN ENG. *The Screamer.*

"*Gavest thou wings and feathers unto the* OSTRICH? *Which leaveth her eggs in the earth, and warmeth them in dust, and forgetteth that the foot may crush them, or that the wild beast may break them. She is hardened against her young ones, as though they were not her's: her labour is in vain without fear; because God hath deprived her of wisdom, neither hath imparted to her understanding. What time she lifteth up herself on high she scorneth the horse and his rider.*"—JOB, xxxix., 13—18 inclusive.

"*The daughter of my people is become cruel, like the* OSTRICHES *in the wilderness.*"—LAMENTATIONS, iv., 3.

THE fifth order of birds, upon which we are now entering, comprises, for the most part, long-legged wading birds, living in the vicinity of water, and entering it to a certain depth. Baron Cuvier divided the entire order into five families or divisions, of which the first is the *brevipennes*, or short-feathered; at the head of which ranges the ostrich, or camel bird.

The ostrich, like the elephant amongst beasts, is the largest bird in existence, and its plumage is much valued as an ornament for the ball-room and the drawing-room. It may even be regarded as the connecting link between quadrupeds and birds. Its height is from eight to nine feet. Its wings are very short, in comparison with the size of its body, and, though ill adapted for flying, greatly assist the bird

THE OSTRICH.

in escaping from its enemies, furnishing at once sails and rudder in its flight, which, for swiftness, is not equalled by any horse whatever. Indeed, so fleet is this bird, that the hunter finds it necessary to begin the chase at a very slow pace, lest the ostrich should at once escape from his sight. It is only by a continuous course, and profiting by the zigzag turnings of this ship of the desert, that the hunter can ever hope to approach it. The ostrich is confined to the arid plains of Africa and Arabia, where, amidst the burning sands, it contrives to sustain itself, feeding entirely upon vegetable substances.

The wings of this singular bird have no quill-feathers, but are clothed with graceful plumes; the latter likewise form the tail. The neck is very long, and half covered with a thin down; the top of the head is bald; the eyes are large and prominent; the bill strong and short; the general colour of the feathers in the males is black, in the females ashy-brown. The white plumes, so much admired, are obtained from beneath the wings and tail of both sexes.

An African traveller, Mr. Burchell, relates the following particulars of the nest and eggs of the ostrich. "In our way over the plain," says this gentleman, "we fell in with an ostrich's nest, if so one may call a bare concavity scratched in the sand, six feet in diameter, surrounded by a trench equally shallow, and without the smallest trace of any materials, such as grass, leaves, or sticks, to give it a resemblance to the nests of other birds. Within this hollow, and quite exposed, lay twenty-five gigantic eggs, and in the trench nine more, intended, as the

Hottentots observed, as the first food of the twenty-five young ones." An ostrich's egg is said to be a sufficient meal for three persons.

The description given by Job in the passage above quoted, so accurately describes the ostrich, that no doubt, we think, can exist as to its reference to that bird, although in the Hebrew text, a word is employed, which signifies the stork, rather than the ostrich.

THE EMEU, OR NEW HOLLAND CASSOWARY.

(Dromiceius Australis.)

In size and bulk the emeu is exceeded only by the African ostrich, attaining a height of about seven feet. It much resembles the ostrich, but is lower on the legs, shorter in the neck, and more clumsily made. Its feathers, at a distance, have the appearance of hair. Their colour is dull brown, varied with dirty grey. The wings are small, having feathers which hang over the body on each side. Their food consists of grass, berries, and other vegetables. They run with such amazing swiftness, that none but the fastest dogs can hunt them. The flesh, in taste, more resembles beef than fowl.

The eggs of the emeu are nearly as large as the ostrich's, but of a green colour. The female lays five or six on the ground. Of the nursing capabilities of the female little can be said. A pair of emeus at Windsor, had five young ones: the female,

THE EMEU.

in various parts of the pen, had dropped nine eggs, which were carefully rolled together by the male bird, and then sat upon by himself. For nine weeks, the period of incubation, the female never took his place, or took the least notice of the young after they were hatched. This happened in June, 1831. It is, however, right to add, that since that period, a female emeu, the property of the Duke of Devonshire, laid a number of eggs, which in the absence of a male bird, she sat upon herself.

An extraordinary variety in this family, is the Apteryx Australis, or Kivi-kivi, of New Zealand. The covering of the body of this singular bird is something between feathers and hair; the wings reduced to a mere rudiment; while the lower extremities are so highly developed that it can kick like a quadruped. The length from the point of the bill to the end of the tailless body is about thirty-two inches; the head and throat are greenish brown, the remainder of the plumage chesnut-brown, with blackish margins; the bill long, yellow, and beset with numerous hairs; the feet are yellowish-brown, with four toes.

The favourite localities of the bird are those covered with fern, amongst which it deposits its eggs. Its habits are believed to be entirely nocturnal: the natives hunt it by torchlight. When closely pursued, the apteryx makes a vigorous and even dangerous defence, kicking with its powerful feet.

It feeds on insects and worms.

THE BUSTARD.

(Otis tarda.)

THE greater bustard is the largest British land bird, being about four feet long: it forms a connecting link between the gallinaceous kind and the ostrich family. It is a handsome bird, but heavy on the wing, and extremely shy. When in danger of being captured, they graze along the ground with a rapid and well-sustained flight. They inhabit bushy plains, feeding on grain, herbs, and insects.

The head, neck, breast, and margin of the wings are blueish-gray; the upper parts of the body reddish-yellow striped with black; the under parts white; the tail white, and brownish-orange barred with black; a tuft of long wing-feathers appears at the base of the under mandible. The male bird also is furnished with a pouch, situated in the fore part of the neck, which will hold about two quarts of fluid. The design of this peculiar organization is little known; but it is said that when attacked by birds of prey, it will throw out the water with such force as to baffle the pursuit of its enemy.

The female is but a bad nurse, building no nest, and abandoning her eggs on the slightest pretext. She lays two eggs of a pale olive brown, with dark spots.

Bustards are scattered over Europe, Asia, and Africa; but are now rarely to be met with in Great Britain.

THE LAPWING.

In Heb. *Dukeephath.*—(Tringa vanellus.)—In Eng. *The Crier.*

"*And the stork, and the heron after her kind, and the* LAPWING, *and the bat.*"—Deut. xiv., 18.

This bird is about the size of a pigeon. The top of the head, crest, fore-part of the neck, and breast are black; the upper parts glossy green; the sides and under parts white.

In France, and some other countries, lapwings are migratory; but in Great Britain they remain during the year, only occasionally changing their locality. On dry ground, but usually near some marsh, the female prepares a bed of dry grass, on which she lays four olive-coloured eggs, spotted with black. Twenty days is the period of incubation; and the young are able to run at the end of two or three days, though incapable of flying until nearly full grown, being carefully watched by both parents. On the approach of an intruder the birds rise on the wing, perhaps a hundred yards distant from the nest, when they set up a loud screaming noise of *pee-wit,* as if they had just left the nest. They fly with increasing clamour as they recede from the nest, whirring and screaming as if they would strike their unwelcome visitor with their wings; or fluttering as if wounded. When very near the nest they appear almost unconcerned, their cries subsiding in proportion as their fears increase. In these feigned efforts, the female is always the more expert. The food of the lapwing consists of worms.

The following little story is from Bewick :—"Two of these birds were put into a garden, when one of them soon died; the other continued to take up such food as the place afforded, till winter deprived it of its usual supply: necessity soon compelled it to draw nearer the house, by which it gradually became familiarised to occasional interruptions from the family. At length one of the servants, when she had occasion to go into the back kitchen with a light, observed that the lapwing always uttered his cry of *pee-wit*, to obtain admittance. He soon grew more familiar; as the winter advanced, he approached as far as the kitchen, but with much caution, as that part of the house was generally occupied by a dog and a cat, whose friendship the lapwing at length conciliated so entirely, that it was his regular custom to resort to the fire-side as soon as it grew dark, and spend the evening and night with his two associates, sitting close by them, and partaking of the comforts of a warm fire-side. As soon as spring appeared he left off coming to the house, and betook himself to the garden; but on the approach of winter, he had recourse to his old shelter, and his old friends, who received him very cordially. Security was productive of insolence; what was at first obtained with caution, was afterwards taken without reserve; he frequently amused himself with washing in the bowl which was set for the dog to drink out of, and while he was thus employed, he shewed marks of the greatest indignation, if either of his companions presumed to interrupt him. He died in the asylum he had chosen, being choked with something he had picked up from the floor. During his confinement,

THE CRANE

crumbs of wheaten bread were his principal food, which he preferred to anything else."

Some doubts exist whether the lapwing be the bird referred to by the sacred writer in the passage quoted at the beginning of this article. Bochart and others believe the hoopoe to be intended.

THE CRANE.

IN HEB. *Ogur.*—(Ardea Grus.)—IN ENG. *The Returner.*

"*Like a* CRANE *or a swallow, so did I chatter.*"—ISAIAH, xxxviii., 14.

CRANES form a large and interesting family, and are scattered over Europe, Asia, and Africa, visiting the higher latitudes only for a time; but spending the larger portion of their time in warm climates. They are all characterised by long and strong bills; the region of the eyes, and base of the bills, are naked and papillous; their legs long and naked.

The body of the common crane is of an ashy colour; the throat and fore part of the neck dusky; the top of the head red and naked; from the pinion of each wing, which is black, springs an elegant tuft of loose feathers curled at the ends, which fall gracefully over the tail, resembling the plumes of the ostrich; the legs and thighs are black. The entire length of the bird is about five feet; its gait being erect, and its figure tall and slender.

Their migratory flights are of the boldest kind,

soaring high, and performing very long journeys. Their height in flying is such, that they are scarcely visible to the eye, and their departure would not be known, but for the loud noise which they make. They formerly used to visit the fens and marshes of Great Britain, but they have long entirely forsaken them.

The ground is selected as their building-place.

THE BALEARIC CRANE.

(Ardea pavonina.)

This beautiful variety derives its name from the supposed identity with the Balearic crane of Pliny, so named from the Romans receiving it from the Balearic Islands. Its habitat is Africa.

The general colour of this bird is bluish, with a black head, adorned with a hairy yellowish crest, moveable at pleasure by the bird; the sides of the head are naked, and almost rose-colour; the wings are pure white; the bill, tail, legs, and feet, are black. Its height is about four feet. It is believed to be migratory. Its walk is slow and majestic; but by aid of its wings, it can move along rapidly: its flight is both high and long. It rests, in common with other cranes, very much upon one leg. This is occasioned, Cuvier remarks, by "the thigh bone which joins the longest leg-bone having in its middle a depression, which receives a projection of the latter bones. In bending the leg, this process is lifted out of the depression, which receives a projec-

THE HERON.

tion, and is returned to its hinder edge. By this motion the ligaments are necessarily more stretched than during the extension of the leg, in which the process remains in its socket. These ligaments, therefore, preserve the leg extended in the manner of some springs, without receiving any assistance from the muscles." Its voice varies from the hoarseness of a trumpet, to the clucking of a hen.

Its habits resemble those of the common crane before described.

THE HERON.

In Heb. *Anaph.*—(Ardea major.)—In Eng. *The Short-breather.*

"*And the* heron *after her kind.*"—Leviticus, xi., 19.

The plumage of this bird, notwithstanding its lanky appearance, is handsome, being of a blueish-ash colour; the crown of the head is white, whence proceeds a long flowing pendant crest of black feathers; a double row of black feathers also adorn the neck; the ridge of the wings is white, the other parts bluish-black; the under parts are nearly bare; the tail is short, and of a brown colour; the legs are a dirty green. The bill is long, with slightly serrated edges; the eyes are yellow, giving the bird a fierce aspect: from its choleric temper it may have received its Hebrew name—*the short breather.*

The common heron is dispersed over most of the countries of the world. In some latitudes it is migratory, in others stationary, though often changing its locality. It chiefly haunts woods in the

neighbourhood of rivers or swamps. Wading as far as it can into the water, it awaits for its prey, which is seized with undeviating certainty. Herons are shy and demure, though irascible: they fly high, especially before rain. Buffon describes this bird as the very picture of wretchedness; but this, probably, is more the language of prejudice, or partial information, than truth. Herons, it is true, when stripped of their feathers, look as though they had been starved to death; but this probably arises from a quick digestion, combined with light food.

During the breeding season they are gregarious, congregating together like rooks, and building their nests in the same place. The eggs are usually four or five in number, about the size of those of a duck, and of a greenish-blue colour. When the female is sitting, the male bird fishes for her, bringing the required supply.

These birds often go an immense distance in search of food, the bones of sea-fish having been found under the nests, in a heronry, at Walton-upon-Thames. A young bird from the same heronry having fallen out of its nest, was taken away in the evening by a gentleman, who carried it to his house at some miles distant, and turned it into a walled garden that night. The next morning one of the old birds was seen to feed it, and continued to do so till the young one made its escape. So wonderful is the economy of nature!

Herons were formerly very common in fenny and marshy districts; but since our country has been better drained and cultivated, heronries have gradually declined in number. Herons were, in Eng-

land's palmy days of falconry, ranked among the royal game, and as such protected by law. The barbarous sport of hawking being happily no longer the diversion of our nobility and gentry, these birds are no longer in request. Their migrations are conducted very regularly, from the middle of August to the setting in of winter: some, however, in mild seasons, continue with us the whole year.

THE BITTERN.

(Ardea stellaris.)

The last of this family which we can notice, is the bittern, which in size nearly equals the heron. The legs are stronger and better covered both with flesh and feathers; the bill, at the base, is strong, gradually lessening to an acute point; the eyes are yellow; the head is covered with long black feathers, and the feathers on the neck, which are long, loose, and of a black colour, the bird has the power to raise or depress at pleasure; the general colour of the back and wings is dark brown, barred with black, and variegated with a yellowish white, which latter colour prevails in the under-parts; the tail is very short; the legs are pale green, and bare above the knee.

The female is somewhat smaller than the male, and her plumage darker. She is not much of a builder, making her nest chiefly of withered grass, and laying from four to six eggs, of a greenish-white colour.

The bittern is a shy, solitary bird, living amongst reeds and rushes in a marshy locality. It is heavy on the wing, flying with a feeble plaintive cry, and in the night, during the breeding season, makes a hollow booming noise. This bird is less irascible than the heron; but when attacked by birds of prey, it defends itself with great courage, and generally beats off such assailants; even when wounded by the sportsman, it will attack him with undaunted vigour, wounding his legs, or aiming at his eyes, with its well-sharpened bill.

The bittern is a persevering and skilful fisher.

THE STORK.

HEB. *Chaseedah.*—(Ardea ciconia.)—ENG. *The Merciful-one.*

"*Yea, the* STORK *in the heaven knoweth her appointed times.*"—JEREMIAH, viii., 7.

THE common stork belongs to a widely-scattered family, being, in some of its varieties, found in Europe, Asia, and Africa; but though fond of a warm climate, is never found within the tropics. It very nearly resembles the crane, but is generally fuller in flesh. The general colours are white and brown. The nails of the toes are peculiar, being flat, like those of a man. The bill is very long and jagged. It feeds upon serpents, frogs, and fish; and is classed by Moses amongst the unclean birds.

Storks make their nests with dry twigs of trees, which they place upon the highest parts of old ruins,

THE STORK.

or upon the tops of mosques and dwelling-houses. The tops of the pillars of the ruined Persepolis are almost all occupied by storks. In other localities they choose the fir and other trees for a dwelling-place. The female lays from two to four eggs. When the young are hatched, both parents are most assiduous in guarding and feeding them: one always keeping watch, while the other goes in search of food. They are said to keep the young longer in the nest than other birds; and then take them forth by day, but returning with them by night. They, moreover, practice them in flying, leading them to the marshes and hedge sides, pointing out serpents, lizards, and frogs, which are their proper food. At the end of autumn they congregate upon some elevated station, whence after a great deal of clamour, they go off together, some of the old birds leading the way, the young ones being in the centre, and a second body of the old ones remaining behind. They return in spring to their original nests. In this return it is not uncommon to see several of the old birds, which are tired and feeble with their long flight, supported at times on the backs of the young, and when they reach home are carefully laid in the old nests, and cherished by the young ones, who had previously received so good a training. These, we believe, to be facts, not fables.

"The stork's an emblem of true piety;
Because, when age has seized and made his dam
Unfit for flight, the grateful young one takes
His mother on his back, provides her food,
Repaying thus her tender care of him
Ere he was fit to fly."—BEAUMONT.

Storks are very common in Holland, Denmark, and other northern countries, during the summer months; but seem to have taken their final departure from Great Britain.

The African variety of this bird is the Marabou Stork, *Ciconia Marabou.* The marabou is about five feet high, the plumage of the back and wings is black, tinged with green; the tail also is black; and under the tail coverts are found the valuable plumes, which are superior to those of the ostrich, and which, with the under parts, are pure white. The bill is very wide, large, and long, of a yellowish hue. From the lower part of the neck hangs a pouch of fleshy white, which deepens into red when the bird is irritated. The marabou in its native country joins with the vulture, as a general scavenger.

Dr. Latham mentions a young bird of this species, which had been domesticated in Africa. At dinner-time it always took its place behind its master's chair, looking out for a share of the meal. Such was its voracity and cunning that the servants were obliged to carry a stick, to prevent the bird from attacking the viands when placed on the table; in spite of their vigilance it was often successful, and has been known to gulp down a boiled fowl entire. It was remarkably unoffending, roosting in the highest trees, and marching about at pleasure. One of the attitudes of this singular bird, when at rest, was sitting on the ground, with its legs stretched out before it.

THE SPOONBILL.

(Platalea leucorodia.)

This bird in length is about two feet eight inches, and the plumage entirely white. It is remarkable for its bill, which is more than six inches long, thick at the base, very flat towards the extremity, rounded like the mouth of a mustard spatula, and of a yellowish colour mixed with brown. The feathers on the hinder part of the head are long and narrow, forming a kind of crest. The toes are connected near their junctions by webs, and with the legs are of a dirty black colour.

Spoonbills are migratory, coming northward in the spring, and returning in the winter. Their range extends between the Ferro Isles and the Cape of Good Hope. They are never far from the sea-coasts, the banks of rivers, or stagnant pools of water, where they procure fish, frogs, or worms; they eat also grasses and roots, which are found in swampy places.

They make their nests on the top of large trees, laying three or four eggs of a white colour, spotted with red. Spoonbills are remarkably clamorous during the breeding season.

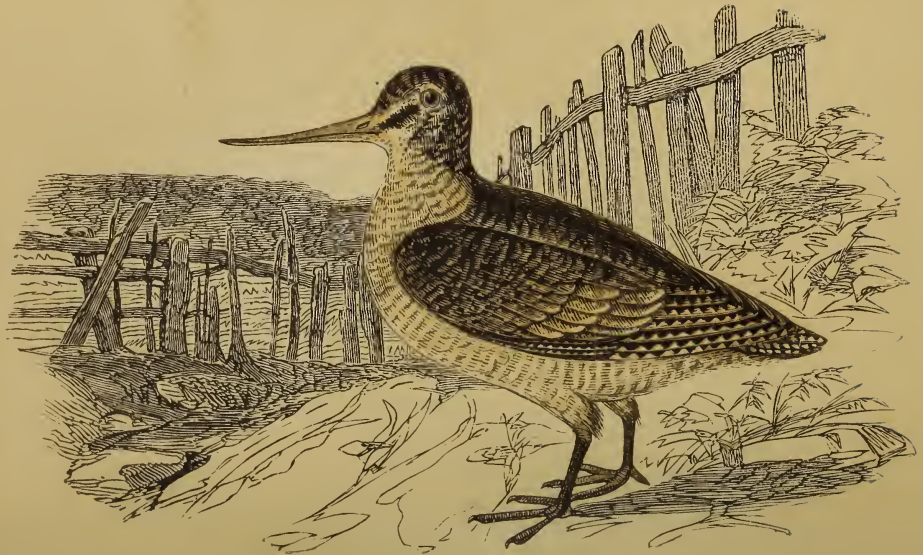
THE IBIS.

(Ibis religiosa.)

Few birds have attracted more notice than the one of which we are now to treat, although its history has been mixed up with fable from a very distant period. Naturalists, until very recently, knew not what bird it was which was so often to be met with in the records of ancient Egypt, referring it to some kind of stork or crane. Bruce, the African traveller, has set this question at rest, by identifying the living bird, as found on the banks of the Nile, with the outline figures on the monuments of Egypt, and mummies found in the tombs: on this accurate information modern ornithologists have founded the genus ibis.

This bird is now far from common in Lower Egypt, but may more frequently be met with above the cataracts. Its services in destroying locusts, serpents, and other such vermin, induced the superstitious Egyptians to pay it divine honours. The ibis was pronounced sacred for political purposes, in order to preserve and multiply so useful an animal. It need therefore excite no surprise, if formerly the killing of this bird was held to be a capital crime. It was, moreover, adopted by the Egyptians as the emblem of their country, and the symbol of the overflowing of the Nile, from its arrival, during breeding season, and departure, coinciding with the com-

THE SNIPE.



mencement and continuance of the fertilizing inundation of that river.

The bill of the ibis is long, slender, arched, and broad at the base; the face, and part of the head and neck, naked; the legs also are naked above the knee; the fore toes united as far as the first joint, the hind toe long, and reaching the ground. The general plumage of this bird is a snowy white: the back and quills black; the upper part of the neck having a browny tinge.

Of their domestic habits little is known.

The Scarlet Ibis, or *Ibis rubra*, though a native of South America, is in all respects like the sacred ibis, the plumage only excepted, which, in an adult male, is a most brilliant scarlet colour, excepting the tips of the wings, which are black.

The progressive changes in the plumage of the young is most extraordinary: the newly hatched birds are covered with down, which is successively blackish-ash colour, then almost white: at this time they begin to fly; and at the second moult the red tinge appears, and increases with age, until the scarlet ultimately assumes its intense brilliancy.

THE WOODCOCK AND SNIPE.

(Scolopax rusticola.)

The Woodcock, or *scolopax rusticola*, is about fourteen inches in length, and three quarters of a pound in weight. The shape of the head is peculiar, being nearly triangular, and the fine black eyes,

almost at the top of the head. The bill is more than three inches long, terminating in a kind of knob, the lining of which is very sensitive, and with an acute smell, assists the bird in procuring its food. The colours of this bird, black, white, grey, ash, red, brown, rufous, and yellow, are so crossed, broken, barred, and streaked, that it is difficult to describe them, but which are so blended together, that they appear at a little distance as the withered stalks and leaves of ferns, sticks, and grasses, so that excepting to a very experienced eye, the bird escapes unnoticed.

Woodcocks arrive in this country from about the beginning of October until December, not in flocks, but singly, or in pairs; taking the precaution, also, of landing during the night, or in hazy weather, the better to conceal their arrival. Neither do they remain on the coast, but proceed inland, and to the same localities which they left the preceding season. In proof of this it may be mentioned, that a woodcock was caught alive and unhurt at Whatcombe, in Dorsetshire. The date of the year being scratched upon a piece of thin brass, was bent round the bird's leg, and then let to fly. In December of the next year, this bird was shot with the brass about its leg, and in the same wood in which it had been caught the year preceding. About the beginning or middle of March, they draw towards the coast, and insensibly disappear.

The female makes a rude nest on the ground, where she lays four or five eggs, of a rusty grey colour, blotched with dusky spots. The young leave the nest the moment they are hatched; but

TEALS.

are still attended to by the parent birds, until they can shift for themselves.

The Common Snipe, or *scolopax gallinago*, greatly resembles the woodcock, but is somewhat smaller.

Its places of resort are, likewise, much the same, being fond of bogs, wet ground, and osier beds, where it is incessantly employed in picking out a small transparent red worm, which constitutes its principal food: slugs, and grubs of insects, are also acceptable. On the least alarm it seeks for shelter amidst the variegated herbage with which it is surrounded, perceiving the sportsman and his dog at a very great distance. When disturbed, it utters a feeble whistle; and from its vigilance, and zigzag manner of flying, is one of the most difficult birds to shoot.

The snipe is migratory, coming to this country in the autumn, and leaving in the spring; yet it is no less certain, that many of these birds remain with us during the breeding season. The female makes her artless nest on the ground, with dry grass and feathers, and lays four or five eggs of a greenish colour with rusty spots. The young run from the nest the moment of their leaving the shell.

Snipes are much in request for the table, their flesh being wholesome and well-flavoured.

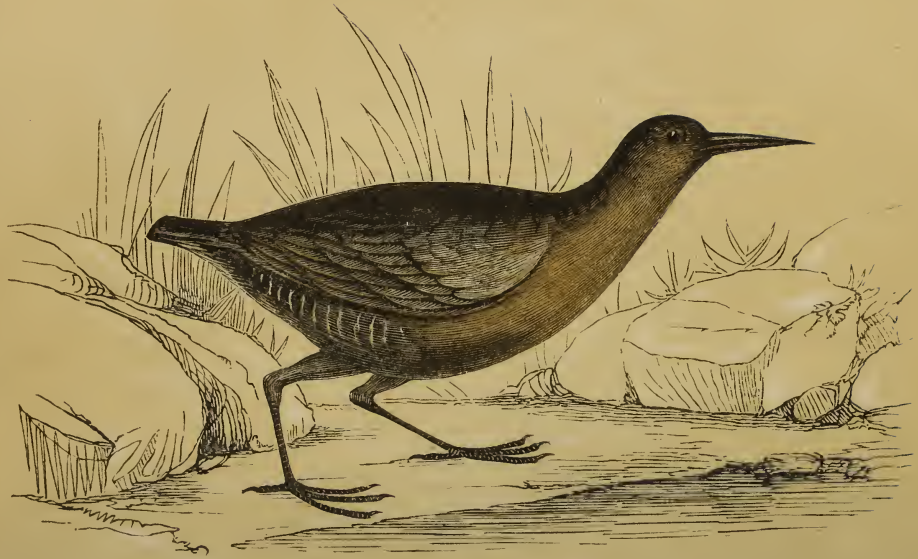
THE RUFF.

(Tringa pugnax.)

The Sandpipers form a numerous and interesting class of birds, resembling each other in having a long and slightly arched bill; slender legs, naked above the knee; the three fore-toes quite divided, or, in a few species, the middle and outer toe connected by a membrane. They, moreover, all frequent marshy places, near rivers, lakes, and seas, ever searching mud, sand, or heaps of seaweed, in quest of insects, larvæ, worms, and small shellfish.

Ruffs, though bearing a general resemblance to each other, are, nevertheless, remarkable for their variety of plumage, since it rarely happens that two ruffs are alike in plumage, a circumstance which is remarkable in wild birds. The general colour is a brownish ash, with transverse bars, and spots of a dusky colour; the belly and under parts white; the tail short, brown, and barred; the legs are yellow. The males are distinguished by a singular ruff at the back of the neck, which, however, does not appear till the second year. After moulting they lose this ruff, which does not grow again until the spring of the year. The female bird is called a reeve.

These birds leave our country on the approach of winter, and become gregarious; in the spring of the year the males return alone. Until the arrival of the females they remain peaceable, but on the appearance of a single female, her feeble cry seems to be the signal for war, for the males begin a desperate fight with each other, which ends by the female becoming the prize of the victor.



Towards the beginning of May the female makes her nest in a dry tuft of grass, and lays about four white eggs, marked with rusty spots.

Ruffs are to be found in all the northern countries of Europe.

The Aberdeen Sandpiper, or *Tringa Icelandica*, is about a third smaller than the ruff, being eight inches long; the head, neck, and back are dusky, marked with red; the lower parts of a cinereous rust colour; the quill feathers are dusky, tipped with white; the legs are long and black. These birds are more common in Scotland than in England; they have also been met with on the coasts of Labrador, and Nootka Sound, and in summer frequent the neighbourhood of the Caspian Sea and the river Don.

Like their compeers, they are ever on the alert, running up and down on sandy banks, picking up insects and small worms. Their habits require no particular notice.

THE WATER HEN.

(Fulica chloropus.)

This class of birds is distinguished by their very long toes, hence called *macrodactyli*. This peculiar organization assists the birds alike in running and swimming.

The weight of the water-hen is nearly a pound,

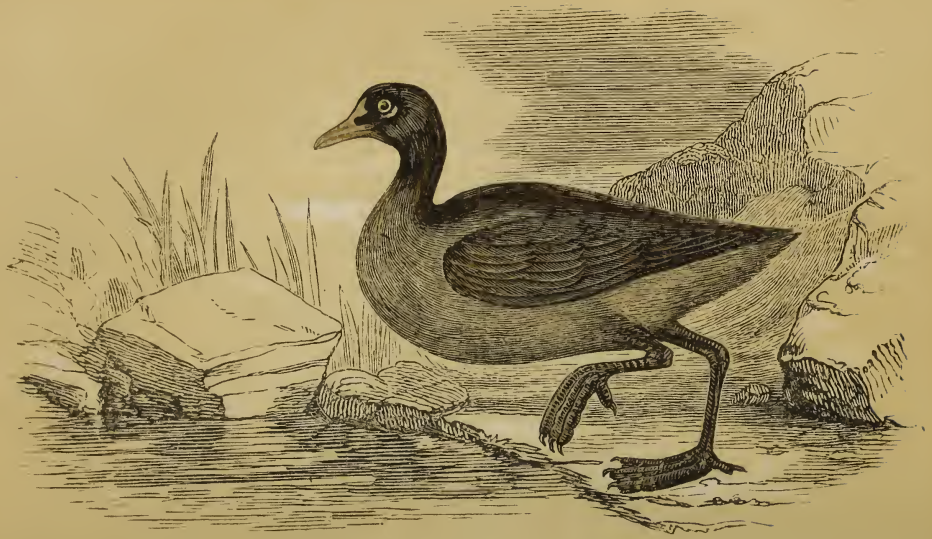
and its length about fourteen inches. The bill is more than an inch long, and reddish at the base, whence proceeds a membraneous substance, which shields the forehead, and which, during the breeding season, is a bright red. The head is small and black, excepting a white spot under each eye; all the upper parts of the plumage are of a dark olive-green, with a brown tinge; the under parts are of a lead colour; the feathers of the wings and tail are black and white; the toes are exceedingly long, and placed far behind.

The water-hen is a shy bird, concealing herself during the day amongst the reeds and osiers by the sides of a river, which is preferred to stagnant water. In the evenings the bird creeps and skulks among the roots and long herbage which overhangs the banks, in search of food, being alike insectivorous and granivorous.

The female makes her nest close by the brink of the water, collecting for that purpose a great quantity of withered reeds and rushes, which she closely entwines, carefully covering up her eggs when she leaves the nest. She lays six or seven eggs, of a yellowish-white, with rust-coloured spots. The young brood do not remain long in the nest, but crawl out, take to the water, and shift for themselves. The mother commonly has two hatchings in a season.

Moor-hens are nowhere very common; but they are to be met with in all parts of the world, and probably in every county of our own country. Although not birds of passage, they make a partial emigration from one district to another, according to the weather.

The Coot, or *Fulica atra*, is as large again as the



water-hen, and resembles it also in habits. It has a callous membrane over the forehead, which, during the season of love, is a bright red. The upper plumage is black, with a little white on the edges of the wing, and a spot under each eye; the under parts are of a dark lead colour. The skin is clothed with thick down.

This bird seems to be the connecting link with the web-footed class, being itself fin-footed, and as good a swimmer and diver as any of them, though a bad traveller on land. It seeks its food on the water's brink, and in the evening of the day. It is but seldom that the sportsman and his dog can force the coot to take wing; it will rather bury itself in the mud, or skulk into any hole it may chance to find, than rise.

The nest is commonly made in a bush of rushes, surrounded by water, with weeds and grass well woven together. The female lays from twelve to fifteen eggs, and generally has two broods in a season.

At Belsay, in Northumberland, a nest was made by one of these birds among the rushes, which afterwards being loosened by the wind, and floated upon the surface of the water in every direction; the bird, notwithstanding, continued to sit as usual, and in due time brought out her young.

No sooner do the young ones disentangle themselves from the eggshell, than they plunge into the water, but still gathering about the mother for some time.

THE RED FLAMINGO.

(Phœnicopterus ruber.)

The last of the order of Grallæ which we can notice, but which does not belong to the family of the *macrodactyli*, or long-toed, is the Flamingo, a bird inhabiting the warmer parts of both continents, but is seldom seen in a higher latitude than the fortieth, north or south.

The bill of this bird is thick and strong, red at the base and black at the tip; the nostrils are in the middle of the bill; the legs are very long, and covered with a membrane, with three toes before, and a very short one behind; the head, neck, and lower parts, are rose-coloured; the wings bright red; the quills deep black; the long red secondary feathers of the wings much exceeding the quills in length. The entire length about four feet and-a-half.

The food of the flamingo consists of small fishes and their spawn, with aquatic insects. They are gregarious, and when feeding, being extremely shy, a sentinel is placed to watch, and give an alarm on the approach of danger, which it does by giving a trumpet-like scream, when the whole flock make a rapid retreat, trusting, however, more to the strength of their legs than their wings.

They build their nests in marshy places, the site thereof being raised more than a foot above the surface of the water; the nest is constructed of mud, scraped together, and hardened by the heat of the sun, or the heat of the bird's body. The nest resembles a truncated cone, or inverted chimney-pot. The

THE FLAMINGO.

female lays only two eggs; and her legs being extremely long, she straddles over the nest, her legs hanging down.

The tongue of the flamingo is larger and more fleshy than that of any other bird. It was greatly extolled by Roman epicures: by our modern voyagers this dish is spoken of as a high luxury.

CLASS II.—AVES, OR BIRDS. [ORDER VI.—PALMIPEDES, OR WEB-FOOTED BIRDS.

DIVISION I.—BRACHYPTERA OR DIVERS.

THE GREBES.

THE palmipedes, or web-footed birds, form a very numerous class; the varieties almost endless. Their bills are of various forms; their legs short; and the toes partially or wholly connected by webs.

Most of the species belonging to this order may be denominated sea-birds. Their plumage is thicker, closer, and better furnished with down, than that of other birds. Some both swim and dive; others only swim, but never plunge under water; while a few are almost habitually resident in the water. They subsist generally on fish, and marine insects; but a few, as geese, swans, and some ducks, feed also on vegetables. They breed in holes, among rocks; or sometimes on the stony beach. Most of them moult twice a year. The young, during the first year, and, in some cases, during several years, differ much

in appearance from the full-grown birds. For the most part they are polygamous and prolific.

All the Grebes have the under parts of their body, and especially the breast, covered with a very compact and glossy down. They dive, and swim rapidly, even under water, and pursue fish to a considerable depth. They alike frequent the sea, and the fresh waters. Fishermen have sometimes caught them in their nets, even at the depth of twenty feet. The male and female grebe greatly resemble each other in appearance.

The Great-crested Grebe, or *Colymbus cristatus*, is the largest of this family, measuring nearly two feet in length. The bill is about two inches and a quarter long, dark at the tip, and red at the base; the bare stripe between the bill and the eyes, in the breeding season is red, at other times dusky. The head of the adult male is furnished with a great quantity of feathers, forming a curious kind of ruff, surmounting the upper part of the neck; those on each side of the head, behind, are longer than the rest, standing out like ears: this ruff is brown and black. The upper part of the plumage is mouse-coloured; the under-parts silvery white; the legs are dusky in front, the inside, with the toes, being greenish.

These birds are common in the fenny parts of England, and are to be found on almost every lake in northern Europe; they are also met with in various parts of the United States and Canada.

Their nest is concealed among the flags and reeds which grow in the water; and should the water even rise so as to swim the nest, the lady-grebe still con-

THE PENGUIN.

tinues the work of incubation : the nest is compactly put together, consisting of dried fibres, stalks, and leaves of aquatic plants.

The Great Northern Diver, or *Colymbus glacialis*, is a very fine bird, often weighing sixteen pounds, and in length is more than a yard. The bill is strong, and of a black colour; the head deep black, glossed with green and purple; the neck has a black bandage about it, on a white ground; the upper parts of the plumage are black with white spots; the under-parts, white; the quill-feathers and tail are black.

These handsome divers are not often seen in England, excepting, very occasionally, during a severe winter. They frequent the arctic coasts of Europe; but seldom quit the sea, excepting at the breeding season, when they repair to the fresh-water lakes of Spitzbergen, Iceland, and Greenland, where they rear their young.

They make a coarse nest, amongst the rushes, or on the shore, the female laying only two eggs of a dirty stone colour. They are strong on the wing, and adepts both at swimming and diving.

PENGUINS.

The Penguins, or *Auks*, form another great family, having bills straight, broad, and compressed; nostrils nearly closed by a membrane, and covered with minute feathers; legs short, placed far behind, and with three toes directed forward; the wings are very

short. These birds are seldom seen on land, excepting for the purpose of breeding; they lay only one egg.

The APTENODYTES DEMERSA, or JACK-ASS PENGUIN, has the bill and feet black; the eye-brows and pectoral band white; the upper parts black-speckled; white beneath; the wings quite unsuited for flight.

They are widely scattered over the Atlantic Ocean, the Antarctic Sea, and the South Seas: they are also numerous on the Falkland Islands, and at the Cape of Good Hope.

The manner in which these birds feed their young is curious. The old bird having made a great noise, between quacking and braying, suddenly puts its head down and opens its mouth, into which the young one thrusts its head, and then appears to suck from the throat of the parent bird for a minute or two; after which the clatter is renewed, and the young one again feeds.

Mr. Darwin, in his *Researches,* gives an account of a rencontre with one of these birds on the Falkland Islands. "Having placed myself," says this writer, "between the penguin and the water, I was much amused by watching its habits. It was a brown bird; and till reaching the sea it regularly fought and drove me backward. Nothing less than heavy blows would have stopped it; every inch gained it firmly kept, standing close before me, erect and determined. When thus opposed it was constantly rolling its head from side to side in a very odd manner. This bird is commonly called the *jackass penguin,* from its habit when on shore, of throwing its head backwards, and making a loud strange noise,

very like the braying of that animal; but while at sea, and undisturbed, its note is very deep and solemn, and is often heard in the night-time. In diving, its little plumeless wings are used as fins; but on the land, as front legs. When crawling on the side of a grassy cliff, it moved so very quickly that it might readily have been mistaken for a quadruped. When at sea and fishing, it comes to the surface for the purpose of breathing, with such a spring, and dives again so instantaneously, that I defy any one at first sight to be sure that it is not a fish leaping for sport."

The Puffin, or *Alca Arctica*. This singular member of the penguin family is often called the sea parrot, from the peculiarity of its bill, which appears as though both mandibles were covered with a sheath; hence the bird is known as the *knife-bill*, the bite of the bird being so severe as to resemble a cut with a knife. The base of the bill is lead colour, the other parts red; the eyes are protected, both above and below, by small callous protuberances; the cheeks are white and grey, with prominent feathers. The upper part of the plumage is black; the under parts white.

The puffins fly with difficulty, and walk awkwardly; the sea being their abode excepting in very tempestuous weather, when they repair to the caverns and holes of the rocks. They feed on crabs, shrimps, and small fish; but with their formidable bills, they can also crush the larger kinds of shell-fish.

In common with others of this species, the puffin makes no nest; yet is rather an anxious mother, defending her young one to the last extremity. This

attachment however ceases when the day for migration arrives; the young, which are not able to fly, being left behind for birds of prey, or to perish for want.

Puffins are found in immense numbers on almost all the rocky cliffs of Great Britain, and in various parts of the northern world. They arrive in this country about April, the whole associated swarm leaving for regions better suited to their future exigences, toward the middle of August.

CLASS II.—AVES, OR BIRDS.] [ORDER VI.—PALMIPEDES, OR WEB-FOOTED BIRDS.

DIVISION II.—LONGIPENNES, OR HIGH-FLYING BIRDS.

PETRELS.

The petrels consist of many species, though only about three can be considered as British birds. They are roving and adventurous tenants of the ocean, being met with by navigators in all climates, and at the greatest distances from land. They sport with the tempest, mounting and descending with the raging billows, without dismay; and making the ocean itself their cradle in calm weather. They seldom venture on shore, excepting during the breeding season, though unmeasured flyers. They make their nests in holes and rocky crevices, continuing for some time on shore, for the purpose of rearing their young. When attempts are made to rob their nests, or an attack is made upon them-

selves, their only mode of defence consists in squirting an oily substance from their throats with great force, upon the face of their enemy. They are known by sailors as mother Carey's chickens, or mother Carey's geese, and their appearance is superstitiously considered to be the certain indication of an approaching storm.

The Stormy Petrel, or *procellaria pelagica*, may be thus described: the head, back, and wings are black; the great wing coverts bordered with white; the lower coverts pure white; the wings much longer than the tail; the bill and feet black. Total length of the bird being little more than three inches, it is the smallest of all web-footed birds.

Vessels on leaving port will be followed by a flock of petrels for many hundred miles, keeping, during the day, in the ship's wake. Constantly and keenly watching, they keep near the vessel, and when any fatty animal matter is thrown overboard, they suddenly stop their swallow-like flight, and whirling instantly down to the water, will crowd together like a flock of chickens, scrambling for the same morsel; at the same time pattering on the water with their feet, and dipping down their heads to collect the sinking object in pursuit. On other occasions, as if to relieve the fatigue of continual flight, they jerk and hop widely over the water, rebounding as their feet touch the water. During a gale their address and alacrity is wonderful. Unappalled by the storm, they appear to trip and sport securely on the roughest sea, taking delight in braving what to others would be overwhelming danger. A little after dark these aërial mariners cease their arduous

daily course; but are found again in the wake of the ship, by nine or ten o'clock the next morning.

Their food consists of marine plants, sea-snails, and small fish. They breed in June and July; but even then, such is their power of flight, that they may be seen out at sea, hundreds of miles distant from the shore. This, probably, led to the vulgar opinion of sailors, that petrels, being in league with the devil, unlike other honest birds, hatch their eggs under their wings, as they sit on the water!

The localities of these birds are the whole of America to Cape Horn, being common on the coasts of Chili, Brazil, and the United States; they are sometimes seen at the Cape of Good Hope, and accidentally, on the coasts of Spain, and in the Mediterranean. They have now and then been shot in England.

The Fulmar, or *procellaria glacialis*. The bill of this variety is strongly formed, hooked, and of a grayish colour. The head, neck, tail, and under parts are white; the back and wing coverts, blue-grey; the quills dusky blue; the legs yellowish, inclining to red. The entire body is thickly clothed with feathers, upon a fine down. The length of the bird is about seventeen inches.

These birds have been met with in both the arctic and antarctic regions, even amid the floating islands, and eternal mountains of ice and snow.

They are caught in great numbers on the isle of St. Kilda, furnishing the islanders with oil for their lamps, down for their beds, a delicacy for their tables, a balm for their wounds, and a medicine for their disorders. Such, at least, was Pennant's opinion.

The fulmars are reputedly great gluttons, clearing the sea of any floating putrid substances which they may chance to find. They pursue whales which may be wounded; and when these monsters of the deep cannot sink, flocks of these birds alight upon the carcases, ravenously plucking off, and devouring large lumps of the blubber.

In common with other birds of this kind, the female lays but one egg, which is hatched during the month of June.

THE ALBATROSS.

(Diomedea exulans.)

The albatross is characterized by a strong hard bill, and considerably curved at its extremity; the feet short, having three toes long, and completely web-footed. It is the largest sea-bird known, weighing from twenty to thirty pounds, and measuring, from wing to wing, from twelve to seventeen feet. The top of the head is of a ruddy grey; the rest of the plumage white, with transverse black bands on the back, and on a few of the wing feathers. The feet are a deep flesh colour; the bill pale yellow.

These birds are not confined to the Southern Ocean, as was once believed, but abound also in northern latitudes, immense flocks of them being found towards the end of June in Behring's Straits and Kamtschatka. They seem to be attracted thither by vast shoals of fish, the migratory movements of

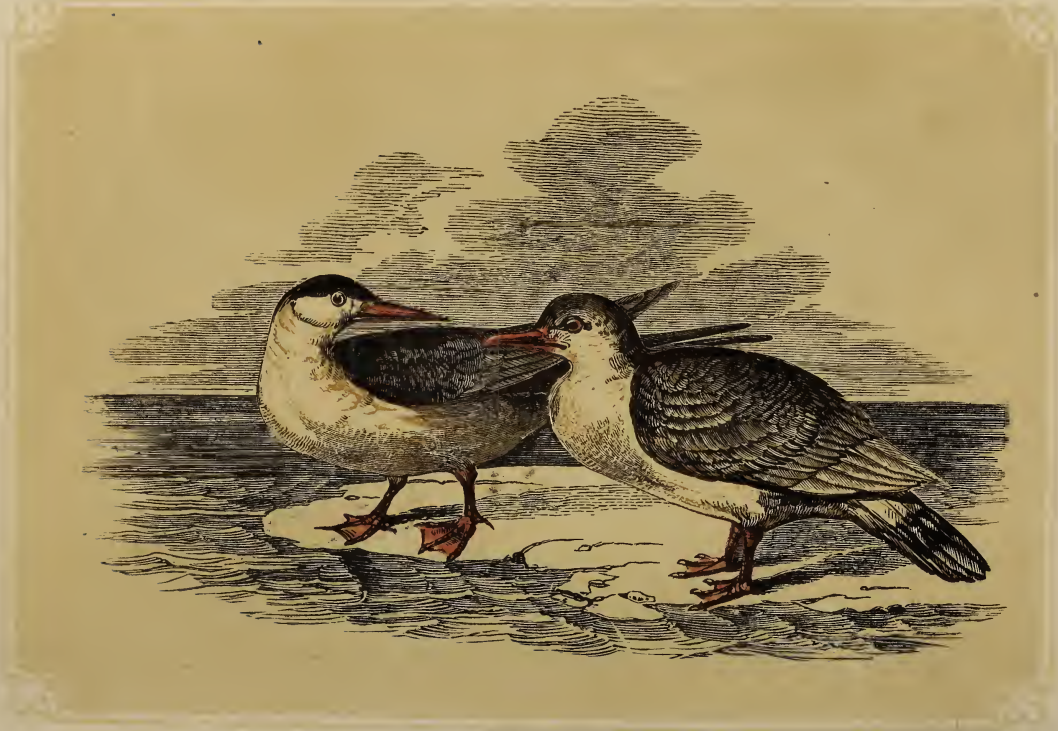
which these cormorants follow. Being great gluttons, they will swallow a salmon of four or five pounds, when, being half choked, and unable to move, the natives readily knock them on the head with a stick. In the absence of nobler prey these birds will feed upon fish spawn, and small mollusca.

Notwithstanding their size and strength, they by no means merit the appellation of *men-of-war*, being naturally cowards, and avoiding aggressive war. Gulls, on the contrary, will often attack them, when the albatross cannot escape but by dipping its body into the water.

The Kamtschadales eat the albatross, though tough and dry, using the entrails as buoys for their nets, and employing the long wing bones for tobacco pipes.

GULLS.

No birds better deserve the name of *longi-pennes*, or *long-quilled*, than the gulls, which constitute an exceedingly numerous family, scattered over every part of the known world; and at certain seasons, in some localities, are found in such multitudes, that the whole surface of the ground is covered with their dung; their eggs are then, likewise, collected in prodigious quantities. Among feathered tribes they bear but an indifferent character, being at once gluttonous, lazy, thievish, and cruel. The stronger will rob the weaker; and their capacious maws are never satiated.



GREAT TERN AND SEA GULL.

The larger species of gulls are more common in cold than in warm climates, being well protected from the storm and the cold, by their power of flight, lightness of body, and the warm downy mantelet with which they are enwrapped: though voracious they can bear great privations, living for many days without taking any sustenance whatever.

Their general characteristics as a family, are a strong and straight bill, bent downwards at the point; a large head; small legs, naked above the knees; feet webbed, with the back toe detached, and very small. To which may be added, incessant restlessness; unceasing crying; and long wanderings in straggling flocks, regardless of the noise of the waves, or roarings of the tempest.

The Common Gull, Mew Skua, or *Larus Canus*, though measuring about a foot and-a-half in length, does not often exceed a pound in weight. The bill is a yellowish-green; the eyes hazel; the back, scapulars, and wings, a pale bluish-grey; the throat, tail, and under parts pure white; the first two quills are black, tipped with white spots; the legs greenish. Of the plumage of these birds, however, scarcely two are alike. These gulls frequent the shores of Great Britain more than other genus.

Their nests are to be found on rocky cliffs; laying two eggs of an olive-brown colour, with reddish blotches.

The flesh of these birds is not much esteemed; but after being buried in fresh mould for a day, or washed in vinegar, they become sweetened, and are said to be good food.

The Arctic Gull, or *Larus Parasiticus*, is a

little larger than the bird last described; its bill being bluish at the base, and black at the tip; on the top of the head is a sort of hood of a blackish-brown colour; the throat, neck, and under parts, pure white; the back, wings, and tail feathers are ashy-brown; the tail terminates with two blackish feathers, which are longer than the rest; the feet are black.

This bird is seldom to be seen in England, being rarely found south of the Shetland and Orkney Islands. To these islands the arctic gull pays a kind of migratory visit, being only seen there between the months of May and August; but it is doubtful whether its visits to the shores of Scotland be not rather for the purpose of procuring food, than for incubation. These gulls rank as princes amongst robbers. Though not larger than many of their compeers, yet, possessing immense power of flight, daring courage, and felonious perseverance, they choose rather to pursue other birds which have captured a prey, than take the trouble to cater for themselves. Ever watching the movements of other birds, no sooner do they perceive a prey to be taken by another, than a vigorous pursuit is commenced, and the aërial evolutions of the *teazer* (for so is this bird called) soon enables it to overtake the unfortunate object of its pursuit, take the prey from it, or, if already swallowed, compel the frightened bird to disgorge.

The natural habitat of these gulls is the North, the shores of the Baltic, Norway, and the Polar regions. In the Polar seas of Europe and America they are far from uncommon.

KESTRELS, MALE AND FEMALE.

TERNS, OR SEA SWALLOWS.

These birds are numerous and widely scattered. Terns of one kind or another are to be met with in almost every part of the world, a few varieties only frequenting the coasts of Britain. All this family have straight, slender, and pointed bills; the wings are very long; the tail forked; and the legs small. Their power of flight is amazing, continuing long on the wing, and rising and sinking in the air with quick and circling evolutions. Gliding along the surface of the water, they are one moment snapping at an insect, and the next darting down upon their finny prey. They not merely traverse the shores, but are also to be met with hundreds of miles out at sea. They appear more restless than usual during the breeding season, incessantly uttering their loud and dissonant screamings.

The Common Tern, Great Tern, or Sea Swallow *(Sterna Hirundo)*, is about fourteen inches long, but scarcely weighs a quarter of a pound. The bill is crimson, tipped with black; the head is capped with black, extending over the eyes; the throat, neck, and under parts are white; the tail is also white, excepting the two outer feathers, which are black. The upper part of the plumage is a fine pale lead colour; the quill feathers being somewhat darker; the legs and feet are red.

The female tern makes no nest, simply scratching a hole in the sand, where she deposits two or three eggs, which vary much in colour. She sits on the eggs during the night, but in the day they are left

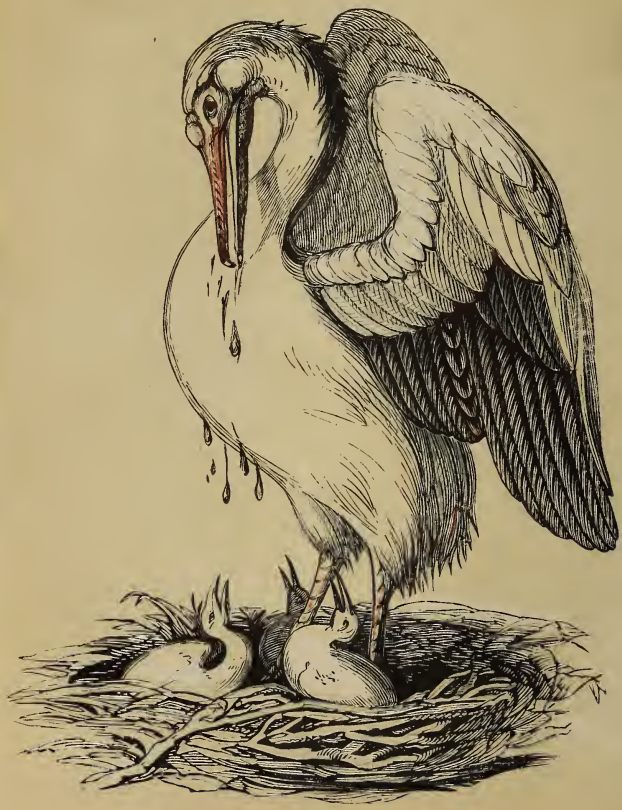
to the influence of the sun, excepting in rainy and dull weather. At this season the parent birds are more than usually clamorous, especially on the approach of an intruder, whom they will defy by flying so near as to touch the unwelcome party.

In Great Britain terns are strictly migratory birds, arriving in the spring, and disappearing in the autumn. Their range is thought to extend from the Arctic Circle to the Mediterranean, and even to the coasts of Africa and India, whither they probably retire during our winter.

The Arctic Tern, or Noddy *(Sterna Stolida)*, is somewhat smaller than the common tern, and its habits very similar. The bill and feet are black; the forehead is white; between the bill and the eye there is a deep black patch; the throat and cheeks are a greyish-brown; the other parts of the plumage chocolate-brown.

Noddies, in the equatorial regions, are seen hundreds of leagues from land, committing themselves to the mercy of the waves, or, in case of need, betaking themselves to ships at sea, where, from stupidity or exhaustion, they may be taken by the sailors with the hand. They are habitual fish-eaters, following, in their rapid flight, the course of the timid and tumultuous shoals, which are known by a rippling and silvery whiteness in the water, the air at the same time resounding with the clangour of their voices.

Unlike other terns, the noddies build a large nest of twigs and dry grass in bushes, or on low trees. The eggs are three in number, of a reddish-yellow, with purple spots.



THE PELICAN.

The head-quarters of these birds are the Gulf of Mexico, the coasts of Florida, and the Bahama Islands.

Noddies have sometimes arrived opportunely to persons wrecked, or in peril at sea. Of this Captain Bligh's narrative affords an illustration, in his boat voyage, after quitting the ship Bounty. In Lord Byron's magic lines on the fate of Pedrillo, the noddy is also referred to.

> "Of poor Pedrillo something still remain'd,
> But was used sparingly—some were afraid,
> And others still their appetites constrained,
> Or but at times a little supper made;
> All except Juan, who throughout abstain'd,
> Chewing a piece of bamboo, and some lead:
> At length they caught two boobies, and a NODDY,
> And then they left off eating the dead body."
>
> *Don Juan*, Canto II.

CLASS II.—AVES, OR BIRDS.] [ORDER V.—PALMIPEDES, OR WEB-FOOTED BIRDS.

DIVISION III.—TOTIPALMES, OR BIRDS ENTIRELY WEB-FOOTED.

THE PELICAN.

HEB. *Kaath.*—(Pelicanus onocrotalus.)—ENG. *The Vomiter.*

"*I am like a* PELICAN *of the wilderness.*"—PSALM, cii., 6.

THE history of this extraordinary bird was formerly enveloped in fable: now that its habits have become known, we can but admire the wisdom of that peculiar organization which is so well adapted to the exigencies of this bird. Though a water-bird, its

capacious pouch seems to have been given to enable it to leave its natural element for a considerable time, without either risking its own personal safety, or that of its young.

Pelicans, though their wings are only of moderate length, are notwithstanding swift flyers, living for the most part on the water, and not approaching land, excepting for the purpose of incubation. The bill is long, and armed at the end with a hook, the width of the gape being very great. The face generally is bare, and the skin of the throat so expansible as to hang down forming a bag or pouch, enabling the bird to swallow fish of a very large size. The feet are strong and short; the four toes being all united by a membrane. The plumage of the pelican is a fine white, tinted with rose or salmon-colour; the primaries and bastard wing are black; the crest and pendulous feathers are light yellow; the naked space round the eyes is flesh-coloured; the bill bluish at the base, and yellowish and red at the tip; pouch yellow; eyes reddish-brown; legs red. Their entire length from five to six feet, being the largest of the genus. They are believed to be remarkable for their longevity.

Fish forms the entire food of these birds, which they capture in shallow inlets with great adroitness, though they never pursue their prey by diving.

The white pelican makes a large nest on the ground, about a foot and-a-half in diameter, formed of coarse reedy grass, and lined with that which is finer. The female mostly lays but two eggs, which are pure white. Great care is taken of the nestlings by the parent birds. In feeding the young,

the under mandible is pressed against the neck and breast, which assists the bird in disgorging the contents of its capacious pouch into the throat of its young: this practice gave rise to the absurd fable that these birds feed their young with their own blood. During the period of incubation the male bird feeds the female in the same manner.

The habitat of the white pelican is in the eastern parts of Europe, also in Asia and Africa.

THE ADJUTANT.

(Ardea gigantea.)

The Adjutant, or gigantic crane, is a native of the warmer parts of India, being common in Calcutta, and its vicinity. Its length is more than seven feet, and the wings when stretched out, measure, from tip to tip, fourteen or fifteen feet. The upper parts of the body are of an ash-grey colour; the under parts white; the head and neck are covered with a red callous skin, but without feathers. The bill is very large, and thick at the base; the gape is likewise very wide.

Although not ranged amongst birds of prey, the adjutant is both voracious and carnivorous. A tortoise, nearly a foot long, and a large male black cat, have been found entire in the capacious maw of these cormorants. The adjutant is notwithstanding extremely useful in the countries which it inhabits, devouring all the garbage of the town, together with

snakes, lizards, frogs, and other reptiles. This bird has often been called the *bone-eater*, from the fact of its swallowing any bone which its gullet will allow to pass: every thing which the adjutant takes being swallowed whole.

The general habits of the adjutant so nearly resemble birds of the same species, already described, that it is unnecessary to enlarge.

THE CORVORANT.

(Pelicanus corbo.)

Ornithologists draw but a dark portrait of the corvorant, possessing as it does considerable energies, with a keen penetrating eye, and great vigour of body; yet being a wary plunderer, an unrelenting tyrant, and an insatiable glutton: only inert, when obliged to belch forth the fetid fumes of a gorged stomach. Such is its nature.

This bird is from four to five feet long, and weighs six or seven pounds. Its bill is hooked and sharp, and of a dark horn-colour, the base of the bill being very expansible, which enables the bird to swallow prey apparently too large for the throat; the eyes are green and staring; the crown of the head black, the feathers being elongated behind, so as to form a short crest; the throat and belly, for the most part, are white; the upper parts of a glossy blue-black; the shoulders and wing coverts inclined to brown; the tail has fourteen stiff

dark feathers, always discoloured, as if dipped in mud; the legs are strong, coarse, and black.

Fish constitutes the entire food of corvorants, among which they make terrible havoc; dropping down upon their prey from the greatest height, with the rapidity of an arrow, and unerring certainty; when emerging they throw up their prey into the air with a kind of twirl, and dexterously catching it head foremost, swallow it whole. This continues till they become surfeited by repletion; when retiring to the ledge of a projecting rock, they set the rifle at defiance; but when overcome by drowsiness, they are often taken by a net being thrown over them.

The female makes her nest on the summit of rocks near the sea, of sticks, weeds, and grass, laying four or five eggs of a greenish-white colour.

These birds were formerly tamed, and employed for catching fish. They were brought to the water hooded, having a leather thong fastened around their necks, lest they should swallow down the fish. The birds were thrown into the water, when presently diving under water, they pursued the fish with wonderful swiftness. When caught, they rise to the surface and swallow them, till each bird has swallowed five or six fish; then their keepers call them to the *fist*, when the birds disgorge the fish only a little bruised. Fishing being done, the thong is removed from their neck, and they are rewarded with a part of the prey which they have caught.

The range of the corvorants extends over Northern Europe: they are not uncommon on our own coasts.

THE GANNET, OR BOOBY.

(Pelicanus bassanus.)

The bill of this bird is long and stout, the edges being serrated; the wings long; tail conical, and composed of twelve feathers; legs short, and placed far behind. The top of the head is yellow; the bill bluish; the eyes blue; the general plumage milk-white, excepting the quills of the bastard wing, which are black; the legs and feet are white, with pea-green stripes. The entire length nearly a yard.

They chiefly haunt the northern parts of the Old and New Continents, and are found in great numbers on the islands of St. Kilda, Orkney, Shetland, &c., where they arrive about March, leaving in September. Some appear to remain permanently with us. Bass Island, in the Firth of Forth, during the months of May and June, is covered with their nests, eggs, and young, so that it is scarcely possible to walk without treading on them. The sea all around is covered with them, and when they rise, they overshadow like clouds. The inhabitants of St. Kilda annually destroy upwards of twenty-two thousand young birds, besides an immense quantity of eggs, which at this time are always consumed. The Gannet rock, in the Bay of St. Lawrence, on the eighth of June, when visited by Audubon, was covered with innumerable gannets upon their eggs, so closely arranged as to give the appearance of a huge mass of snow, while the hovering crowds of birds presented, at a distance, the appearance of a snow storm.

The term *booby* appears scarcely applicable to the

northern gannets; their habits, and struggles for liberty, proving that the self-preserving principle is as strong with them as with other birds. To the gannets of warmer climates the appellation may be appropriate, since they will calmly wait to be knocked on the head, as they sit on shore; or perching on the yard of a ship, will allow the sailors to take them off with their hands.

The American Darter, or Snake-Bird. This bird is a singular variety of the pelican family. It is found in the Carolinas, Georgia, the Floridas, and Brazil. In length this bird is more than a yard; its bill long, slender, sharp-pointed, and armed with numerous sharp teeth towards the tip, black above and yellow below; a bare yellow space round the eyes and the chin-pouch; the eyes red; the neck very long; the head, neck, and general plumage, black, glossed with green, singularly varied with dull white spots; the scraggy crest is brownish; the wings long and pointed; the tail long, rounded, and curiously crimped; feet very short, the four toes of which are united by a membrane of great breadth.

These birds sit in small communities on the dry limbs of trees, overhanging the still waters, with their wings and tails expanded. On the approach of danger, they drop into the water as if dead, and for a minute or two are not to be seen, when, at a great distance, their long slender head and neck appear, like a snake rising erect out of the water; no other part of them is to be seen, when swimming, excepting sometimes the end of their tail. They are strong on the wing, soaring to an immense height.

The female makes her nest of sticks, building in a

tree of the swamps, and laying two eggs, of a sky-blue colour.

THE TROPIC BIRD.

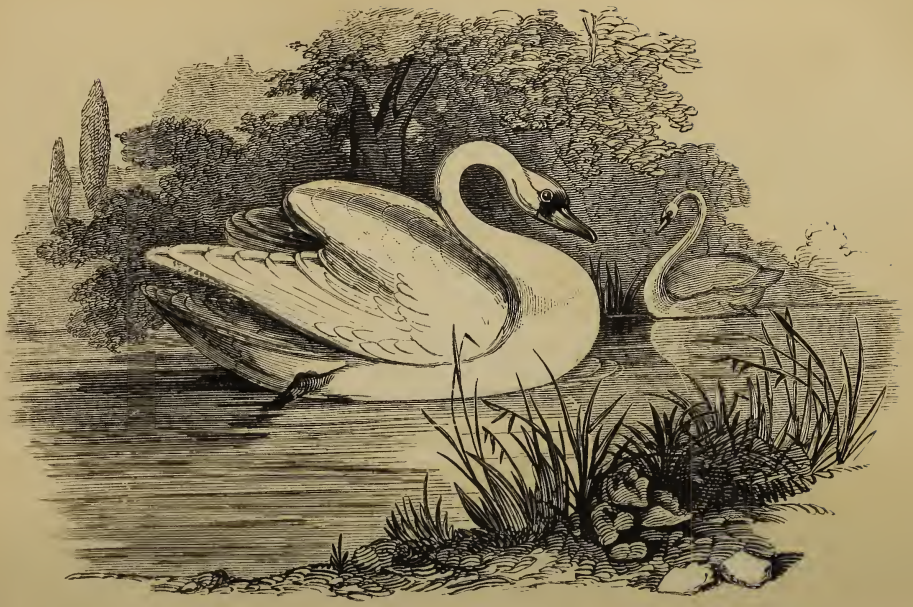
(Phaeton phœnicurus.)

The bill of this bird is stout, sharp-edged, and pointed; nostrils covered by a naked membrane; wings long; legs very short, with all the toes connected; tail short, but the two filamentous middle feathers very long. The plumage of a roseate flesh-colour; the bill and long feathers of the tail red; the legs black. The length of the bird to the end of the tail feathers, about a yard.

These birds inhabit the South seas, and, from announcing an approach to the tropics, are well known to navigators. They are capable of supporting long flights, and of reposing on the water, feeding on the flying and other fishes that approach the surface. They have the credit, also, of being enemies to the boobies, which they chase, and compel to disgorge whatever prey they may have recently swallowed. In common with all this family, their gait on the ground is but awkward, on which, in fact, they seldom alight, excepting at a particular season. On the wing they glide through the air, or along the water, with grace and agility.

Tropic birds breed on desert and unfrequented rocky islands, laying usually two eggs.

TROPIC BIRD.



THE SWAN

SWANS.

"*And these are they which ye shall have in abomination among the fowls:——the* SWAN."—LEVITICUS, xi., 13, 18.

SWANS are extensively scattered over the northern regions of Europe, Asia, and America; and, though in some minor respects different, yet, from external appearance, their identity cannot be mistaken. The generic characters of swans are, a bill of equal breadth throughout; higher than wide at the base; depressed at the point; both mandibles furnished along the sides with transverse serrated lamellæ; nostrils oblong, near the middle of the bill; the neck slender, and very long; legs short, with the hinder toe free. The colour pure white, with sometimes a buff tinge on the top of the head; the bill black, but yellowish at the base; the eyes brown, and the feet black. Length about five feet; from one extremity of the wing to the other, eight feet.

The WILD SWAN, or *Cygnus ferus*, utters a note resembling the word *hoop, hoop*, which the peculiar construction of the trachea, or windpipe, enables it to do, especially when flying. This bird is, in all probability, the swan so much celebrated by the ancient poets for its dying song.

The wild swans, in common with the whole of the genus, live chiefly on aquatic vegetable substances. They have the capability of keeping their heads for a

considerable time under water, in search of food, but are never known to dive.

Their nests are large, and constructed on the ground with dry flags, rushes, and grass. The females lay six or seven whitish eggs, tinged with green. The young, for some time, are very unlike their parents, being covered with a greyish-coloured down. The nursing powers of the mother are not of the first order.

The geographical distribution of these birds is expansive, being found alike in the northern regions of Europe, Asia, and America. Many of them reside within the Arctic Circle during the summer, but pass the winter in Italy, Barbary, Egypt, and as far easterly as Japan. To the British islands they are but winter visitors, although they sometimes breed in the Shetland and Orkney islands, and in Sutherlandshire.

The Tame or Mute Swan differs but little from that just described. The structure of the trachea, or windpipe, is more simple, but the large black tubercle at the base of the bill is its chief external distinction. This elegant inhabitant of our lakes and rivers requires no description, being so well known.

The swans in the Thames belong to the Queen and two of the City companies, the Vintners and the Dyers. Although an annual *swan-hopping*, or the catching and taking up of the swans and cygnets to be marked, is continued by the two companies just named, in company with the royal swanherd's man, as far as Henley, the swans, notwithstanding, on that river are obviously on the decrease. Each family of swans on the river has its own district, and should the limits be encroached upon by other swans, an

THE BLACK SWAN.

immediate pursuit takes place, and the intruders are driven away. In other respects, they appear to be quiet and unoffending birds, but in the event of their being put upon their mettle by an attack, they will make a furious, and even a dangerous defence, a flap with their powerful wing having been known to break a man's leg.

The Black Swan, or *Cygnus atratus*, is an extraordinary variety. Little did the Roman satirist, Juvenal, suspect that a black swan would ever adorn our lakes and canals, when he wrote, "*Rara avis in terris nigroque simillima cygno.*"

These birds were first noticed by Vlaming, a Dutch navigator, who, in 1697, sailed forty or fifty miles up Swan River, Western Australia, in a boat. The enterprising Captain Flinders explored this coast in 1802, and found black swans in immense flocks, in the estuaries of the Tamar and the Derwent. Of these flocks Captain Flinders observes, "From one-fifth to one-tenth were unable to fly; they cannot dive, but have a method of immerging so deeply in the water, as to render their bodies nearly invisible, and thus frequently avoid detection. In chase, their plan was to gain the wind upon our little boat, and they generally succeeded when the breeze was strong, and sometimes escaped from our shot also."

These birds are quite black, excepting a few of the quill feathers, which are white; the bill bright red above, but crossed by a whitish band; the legs and feet ash-colour; the eyes red. In size they are somewhat smaller than the other swans. Their plaintive note is rather pleasing.

GEESE.

The birds which compose this numerous family are scattered throughout the world, differing in size and appearance, yet retaining obvious indications of the genus to which they belong. Their flesh has ever been regarded as one of the delicacies of our table. To them we are indebted for a soft and warm bed at night, and the poor scholar, especially prior to the introduction of steel pens, was under great obligations to goose-quills, as a means of enabling him to commit his thoughts to paper.

Geese have been, partially at least, in bondage to man from time immemorial. The following marks are impressed upon the whole family:—Bill strong, straight, and covered by a thin skin; the edges of both mandibles having flat lamellated teeth; the nostrils almost at the surface of the bill, at some distance from the base; the legs short, and feathered to the knee; the three fore-toes only webbed. They all fly with ease and gracefulness, feeding either on fish, vegetables, or grain. Some are divers, others not, excepting in cases of emergency. Many are found in fresh water, others in salt. Most of them, in common with birds generally, moult twice a-year, namely, in June and November.

The Lag, or Wild Goose (*Anas anser*), the original stock of our tame geese, must first be noticed. Their plumage is cinereous above, pale beneath; the bill yellow; length of the bird nearly a yard, and their weight about ten pounds. Those that visit us inhabit the eastern and central parts of Europe, though also

scattered throughout the world. They migrate toward the north in spring, returning southerly in the autumn; some, however, continue permanently with us. These birds fly in companies of from fifty to a hundred, and at very great heights; yet such is the clamour which they make, that they may often be heard when not visible to the sight. It has been noticed that they fly in some geometrical figure, which is ever varying, from the fact that the foremost bird falls into the rear, the next in succession occupying its place. During these flights they never alight but for the purposes of rest.

Those that breed in this country make their nests in marshy places, and on the ground.

The predominant colours of the Tame Goose are white and grey: the males, or ganders, are usually pure white. The weight of these birds varies from nine to fifteen, or even to twenty pounds. Formerly they were driven to London in droves, a practice now nearly discontinued. *The Saint James' Chronicle*, of September 2nd, 1783, notices, that a drove of about *nine thousand* geese passed through Chelmsford on their way to London, from Suffolk. Tame geese are still bred in vast multitudes, in different parts of the country. A single person has frequently a thousand old geese, each of which will rear, on an average, seven goslings. In Scotland, and probably in England also, these birds, during the breeding season, lodge in the same house with the inhabitants, their very bed-chambers being so occupied: in every apartment are three rows of coarse wicker pens, placed one above another; each bird has its separate lodge. Twice during the day they are driven to

water, and then brought back to their respective nests, those living in the upper stories being helped to resume their places. The tame goose is reputedly very long-lived; this perhaps is somewhat problematical, since the breeders of these birds take care that the superannuated geese and ganders, having become uncommonly tough and dry, shall be sent off as a *treat* for the novices of London: such birds, are, in the trade, technically called *cagmags*.

The poor geese are regularly plucked five times in a year; the first plucking is about Lady-day, for feathers and quills; and the same is renewed four times more between that and Michaelmas, for feathers only. The old geese, (nature having kindly assisted them by a thickening of the skin,) submit quietly to the operation, but the young ones are very noisy and unruly. If the season prove cold, numbers of the geese die by this barbarous custom.

The wakefulness of the goose is proverbial. Not the least, or most distant noise, during the night, can be made without rousing the geese, who instantly begin their cackling; and on the nearer approach of apprehended danger, they set up their more shrill and clamorous cries. They once saved Rome from the attempts of the Gauls; and have ever been esteemed the most vigilant of all sentinels.

Passing by the numerous varieties of this genus—the Swan goose, the Canada goose, the Egyptian goose, the Siberian goose, the Bernacle goose, the Bean goose, the Brent goose, and the Snow goose, we content ourselves with a brief notice of the Cereopsis Goose, or *Cereopsis novæ Hollandinæ*. This bird, in size, equals the common goose. The membrane or web

of the feet, scarcely reaches beyond half the length of the toes, which are armed with long and strong nails. There is a broad patch on the top of the head of a dull white colour, the rest of the plumage being of a dingy grey; the wing coverts are marked with round dusky spots, such spots being much larger on the back and shoulders; the bill is yellow, tipped with black; the eyes hazel; the legs orange; the toes, web, and nails, black. They are natives of Australia.

The general habits of the cereopsis do not differ from the wild geese of the northern hemisphere. They perform at least a partial migration, although they are believed not to continue in the interior, but remain near the coast. The crew of Captain Flinders procured a considerable number of these birds, both at Lucky Bay and Goose Island, by knocking them down with sticks. They were pronounced well-flavoured, the Captain remarking that, on Preservation Island, they formed the best repast of his men. Their average weight is about seven pounds. They feed on grass; but rarely take to the water. The voice of the cereopsis is deep and hoarse.

Specimens of this variety have been brought to this country, and formed part of the extensive collection kept by his late Majesty, William IV., in Windsor Great Park. They were perfectly tame, resembling other geese in behaviour, and there also they bred. On the demise of his Majesty, they were transferred to the Zoological Society.

DUCKS.

If the family last noticed be numerous, that upon which we are now entering is still more so, ducks being found in all countries, inhabiting the waters, whether fresh or salt; they are also of various sizes, much diversified in colour.

The Wild Duck, or *Anas boschas,* may be considered as the type of the first division, or *non-divers.* All of this division have the following characters in common :—Considerable length of neck; the wings long, reaching to the end of the tail; the hind toe free, having no web. They frequent fresh water, but pass much of their time on land, feeding in ditches, and about the shallow edges of pools, on aquatic plants, insects, worms, and fish; taking their food at or near the surface; possessing also considerable power of flight; but seldom diving, unless pursued. These characters arise from an internal uniformity of structure. In the bills of ducks alone do we find a breadth considerably dilated, and of a texture unusually soft : in addition, their cutting margins are provided with numerous transverse lamellar plaits, forming a sensible and elongated palate. The offensive matter taken into the mouth, is by this means tested and ejected. The mouthful of stuff, brought perhaps from the bottom, is sifted, and the nutritious part alone retained. The tongue also is materially employed in this process, being unlike that of other birds : it is remarkably large, thick, and fleshy.

The Mallard, or Common Wild Duck, has a

bill of a yellowish-green colour; the head and upper part of the neck are a glossy changeable green, terminated by an encircling white collar; the wings are brown, and prettily crossed; the beauty-spot of a rich glossy purple, with violet reflections, bordered by a double streak of black and white, which crosses the wing when closed, in a transverse oblique direction; the belly pale grey, delicately pencilled; the lower part of the back, and middle tail feathers are black; the legs, toes, and webs, are red. The female has the beauty-spot, but in other respects is a plain bird.

The female constructs her nest in sequestered morasses or bogs, laying from ten to sixteen greenish-white eggs. To her unfledged brood, she may, for a duck, be pronounced an attentive mother, leading them from one pool to another for about three months, when they are able to shift for themselves.

They arrive in Great Britain at the beginning of winter, in large flocks; most of them retiring northward in the spring to breed. Many straggling pairs stay with us throughout the year.

Immense numbers of these birds are caught with decoys, from the latter end of October till February, the season allowed by act of parliament. "These decoys," says Bewick, "are formed by cutting tapering ditches, widened and deepened as they approach the water, in various semicircular directions, through the swampy ground, into particular large pools, which are sheltered by surrounding trees or bushes, and situated commonly in the midst of the solitary marsh. At the narrow points of these ditches or cuttings, farthest from the pool, by which they are

filled with water, the fowlers place their funnel-nests: from these the ditch is covered by a continued arch of netting, supported by hoops to the desired distance; and all along both sides, screens formed of reeds are set up, so as to prevent the possibility of the birds seeing the decoy-man; and as these birds feed during the night, all is ready prepared for this sport in the evening. The fowler, then, placed on the leeward side, sometimes with the help of his well-trained dog, but always by that of his better-trained tame decoy-ducks, begins the business of destruction. The latter, directed by his well-known whistle, are excited forward by the floating hempseed, which he strews occasionally upon the water, to entice all the wild ducks after them under the netting; and so soon as this is perceived, the man or his dog is from the rear exposed to the view of the birds, by which they are so alarmed that they dare not offer to return, and are prevented by the nets from escaping upwards: they, therefore, press forward in the utmost confusion to the end of the ditch, where funnel or purse-nets are prepared to receive them." In this manner thousands of these birds are captured, and sent to London, and elsewhere.

Our Tame Ducks, which are of all colours, are doubtless derived from the Mallard. Of all the common sorts, perhaps the Aylesbury duck best deserves notice. It is a large bird, quite white, with a silvery bill. The town of Aylesbury, and its neighbourhood, have long been famous for rearing these birds. The eggs are hatched within doors, about Christmas, when every nook and corner of

the breeder's house, even under the beds, are occupied by baskets or tubs, containing usually thirteen eggs, which are sat upon by hens. The poor hens, willing or unwilling, are placed on the eggs, and by being covered, however reluctant at first, they ultimately settle down to the work of incubation. The moment the ducklings are hatched, the hen is suffered to go at large, her brood being put into a pen, containing from twenty to fifty young ones. They are at first fed on soft food, as bread and milk, and afterwards with grain, chiefly oats: they are also supplied with water, but are never suffered to enter it. In this manner they soon become fat, being ready for market by about Lady-day, when they are much in request for the table, and fetch a good price.

The WIDGEON, or *Anas Penelope*, ranges among the true ducks. It measures about twenty inches, and weighs, on an average, a pound and-a-half. The bill is lead-colour, tipped with black; the crown of the head is high, and of a cream-colour, with a small spot of the same under each eye; the rest of the head, neck, and breast, are bright chestnut with black spots; the belly is white; the speculum of the wing consists of three bands, the middle one green, the lateral, deep black; the feet of a dingy lead colour.

The female is smaller and much plainer than the male: after the breeding season the male loses his gayer plumage, and very nearly resembles his mate. The young are all grey when hatched, and continue so until February.

Wigeons quit their desert retreats of the north on the approach of winter, and spread themselves over

the marshes and lakes of Southern Europe. In March, adorned in their bridal attire, they migrate northerly for the purpose of incubation.

These birds fly in flocks, during the night, and may be known when on the wing from other birds by a whistling note.

The Summer Duck, or *Anas sponsa*, though inferior in size to other birds of this family, possesses a compactness of form, with exquisite beauty of plumage.

The head above, and space between the eye and bill, glossy dark green; cheeks, and a large patch on the sides of the throat purple, with blue reflections; pendent occipital, crest of green and purple, marked with two narrow white lines, one of them terminating behind the eye, the other extending over the eye to the bill; sides of the neck purplish red, changing on the front of the neck and sides of the breast to brown, and there spotted with white. Scapulars, wings, and tail, exhibiting a play of duck-green, purple, blue, and velvet-black colours: the chin, throat, a crescent round the neck, and belly, white; the tips of the long feathers barred with white and black; the inner wing-coverts white, barred with brown; the bill is red, but the tip, margins, and lower mandible black; the legs, orange-colour. All the plumage of this beautiful bird shows a play of colours with metallic lustre. This description refers alone to the male, the female being of a brown plain colour.

This species ranges over the whole of the United States, making only a partial migration, and confining itself to fresh-water lakes, and ponds.

The summer duck is remarkable for building its nest in the hole of a decayed tree; resorting to the same locality from year to year: they build on the branches of a tree, and never on the ground. Though very shy birds, they partially forget this during the season of love, often resorting very near to the habitation of man for the purpose of incubation. The eggs, which in number range from six to fifteen, are carefully covered up when left by the parent bird: the nest being amply lined with feathers supplied chiefly from the breast of the mother, although feathers of other species of birds are always found. In the event of the nest not being far from the ground, the young ones almost so soon as hatched throw themselves on the ground and take to the water, but if the height be too great, the mother takes the young one by one in her bill by the wing, and carries them to the water, returning them to the nest in a similar way.

These birds breed readily in captivity, several broods having been reared in the Zoological Gardens, Regent's Park; and we believe also within the enclosure of St. James's Park.

The Teal, or *Anas crecca*, is the last of this family which we can notice. It is only about fourteen inches long; the head, cheeks, and back, chestnut-red; a broad green band extends from the eyes to the nape; the lower part of the neck, back, scapulars, and flanks, striped with black and white zigzag lines; breast reddish, with round spots; the belly yellowish-white; speculum of the wing half white and half black, edged with two white bands; the bill dusky.

This beautiful bird is common in England during the winter months; some of them probably remaining throughout the year to breed. They are also widely scattered over Europe.

The female, a plain bird as compared with her mate, makes a large nest on the ground, in some retired reedy site near the water. The eggs are dull white, spotted with brown, and six or seven in number.

Teals are caught in great numbers, being highly esteemed for the table.

DUCKS.

DIVISION II.—DIVERS.

The general characteristic of this division of true ducks will be found somewhat opposite to those just described. The neck and wings are short; the toes short and compressed; they frequent the sea, or the deep parts of fresh-water lakes; are seldom seen on land, their walk being embarrassed from the backward position of their legs; but they dive constantly and with great facility, taking their prey below the surface; their food consists of finned and shell-fish, and on marine insects; their power of flight is only moderate.

The Golden Eye, or *Anas clangula,* is seventeen inches in length, weighing about two pounds. It is a handsome sprightly bird, having a very short bill, the base broader than the tip; the

back, rump, and part of the scapulars deep black; coverts of the wings, and under parts, white; the tail cinereous; the eyes brilliant yellow; the legs are short, and of a reddish-yellow, with large flatted webs of a dusky colour.

These birds frequent fresh water, as well as the sea; they are excellent divers, and seldom set foot on the shore, excepting during the breeding season, or for rest: from the peculiar structure of their feet and legs, they appear to walk with some difficulty. They leave this country late in the spring; are never found in large flocks, or very numerous in Great Britain.

Their special habitat is the Arctic regions.

The Tufted Duck, or *Anas fuligula*, is the last of this family which we propose to notice. This bird is the very prince of divers, proofs of which may be seen any fine day within the enclosure of St. James's Park, where the tufted duck is wont to display its talent for diving, and keeping under water for a considerable time. The size, weight, and general habits, are the same as those of the *golden eye* just described. It is a native of the Arctic regions.

The male is distinguished by a pendent crest, overhanging the nape of the neck, two inches in length: the bill is broad, and of a dark colour: the eyes deep orange; the head black, glossed with purple; the neck, breast, and all the upper parts are a brown black; the wings are crossed by a narrow white bar; the belly, sides, and under coverts of the wings, are pure white; the legs a dark lead colour; the webs are black.

GOOSANDERS.

The generic characters of this sub-family of geese and ducks are as follow: a bill straight, narrow, and slender, wide at the base, and abruptly hooked at the tip; the margins of both mandibles serrated backward; the tongue slender; feet short, with full palmated toes. They are constantly on the water, almost submerged; often dive and with great facility, remaining long under water: they are strong on the wing, and fly very swift.

The Goosander, or *Mergus Merganser*, measures about two feet, and averages four pounds in weight. The large and thick tuft on the head, and part of the neck, are greenish-black, with varying reflections; the lower part of the neck, breast, belly, and coverts of the wings, of a yellowish rose-colour; the upper part of the back and scapulars, deep black; the rest of the back, and tail, ash-coloured; the beauty-spot on the wing, white; bill red, with black tip; eyes reddish-brown; feet red.

From the security with which the bird holds its prey between its toothy mandibles, it is often called the *Jack-saw*. Fish is its principal food.

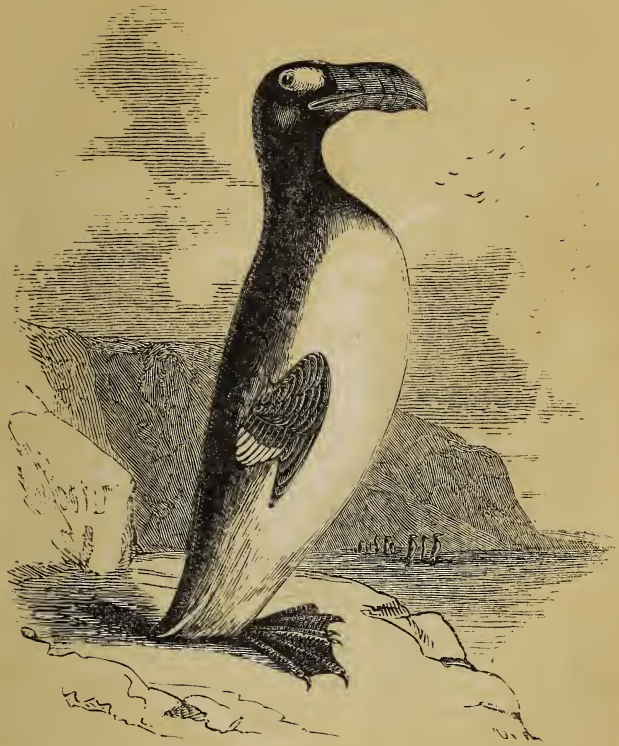
The nest is built in bushes of hollow trees, on the banks of rivers; the female laying twelve or fourteen whitish eggs.

The flesh of this bird is rank and bad: according to the old French poet:—

"—— qui vauldroit festoyer un diable,
Vauldroit un Bieure avoir pour son manger."

"He who would regale the devil may
Serve him with a Goosander."

THE EGRET.



The northern regions of Europe and America are the habitat of the goosander.

The Smew, or White Nun (*Mergus albellus*) is another singular variety of the goosander family. It is about the size of a wigeon; the bill is a dusky-blue; the eyes are dark; on each side of the head, from the mouth over the eyes, is an oval-shaped black patch, glossed with green; the other parts of the head and neck ruddy; the breast, belly, and vent, are white; the back and wings are black and white; the tail is ash-colour; the legs and feet, lead-colour.

The smew inhabits the arctic regions of Europe and America.

THE GREAT EGRET.

(Ardea egretta.)

The plumage of the Egret is pure white; a pendant crest is on the head; some long feathers on the back, with short shafts, and loose slender webs; the legs, long slender, and black; the claws very long. Its entire length rather more than a yard.

These birds perch, and build their nests on high trees; and feed on frogs, eels, and fish.

The egret is found in almost every climate, and was formerly plentiful in Great Britain.

[This beautiful bird should have ranged with the herons, p. 137.]

FISH.

ON FISH IN GENERAL.

So large a portion of the earth being covered with water, it seems natural to infer that this element should be stocked with animals adapted to such a medium. Accordingly we find that the waters, whether fresh or salt, are everywhere abundantly stocked with fish, and other aqueous creatures, many of which exceed in bulk the largest terrestrial animals; while others are so minute, as effectually to escape our notice, but for the aid of the microscope.

The correct definition of fishes is, that *they are vertebrated animals with cold red blood, respiring by gills, or branchiæ, and moving in the water by the aid of fins.*

The form of fishes seems as admirably adapted for motion in water, as that of birds for flight in the air. Suspended in a liquid of nearly the same specific gravity as their own bodies, they do not require extended members for their support. Their general form is elongated, but thicker in the middle than at the extremities; and the tail, the principal instrument for their progressive movement, is always long, and terminated by a vertical fin, capable of expansion and contraction like a fan. The organs of locomotion in fish assume the form of fins, of which those called *pectoral*, from their situation on the body, may be considered as analogous to the fore-feet of quadrupeds; those placed further backwards,

called *ventral fins*, may represent the hind feet of mammals. The vertical fins on the back are termed *dorsal fins;* and those on the under surface of the body *anal fins;* the fin by which the tail is terminated being called the *caudal fin.* The membranes of these fins are supported by rays or bands, more or less numerous, and are either solid, bony, and of a pointed form, and called *spinous rays;* or are composed of a number of small joints, generally divided into branches at their extremity, and called *soft* or *articulated rays.*

Fish, generally speaking, have four fins or members, yet subject to considerable variety; some families having only two, and others wanting them altogether.

The greater part of fishes make their progressive motion in the water by means of an expanded tail, which, striking the water alternately from right to left, impels them forward; and they change their direction by striking more rapidly, or with greater force on one side than another. The fins, which are in pairs, besides aiding in progression, serve also to maintain the equilibrium of fish in the water, and to regulate the direction of their course.

Fishes, besides having their bodies admirably constructed for the fluid in which they move, have a singular apparatus, for rendering them specifically lighter or heavier than water, consisting of a membraneous sac, or *swimming bladder,* placed under the spine, and which, by compression or dilatation, enables them to rise or sink in the water.

Living also in a fluid element, fishes are provided with respiratory organs of a peculiar construction in

their gills or *branchiæ*, which are placed on the sides of the neck or head. The *branchiæ* are composed of a great number of separate *laminæ*, covered with innumerable blood-vessels. The water which they swallow passes between these *laminæ*, and escapes by the branchial openings. In its passage, the blood, which is sent from the heart to the gills, is acted upon by the air contained in the water. This process is essential to the life of fishes, for if confined only in a fine muslin bag, the result would soon be fatal. The branchial openings, or gills, are covered in some cases by a long moveable plate, termed the *operculum*, or gill-cover; in others, by a simple membrane, with one or more openings.

The *vertebræ*, with the addition in most cases of spinous processes, keep the body of the fish in a vertical position. The head of fishes varies more in form than in any other class of animals, which, notwithstanding, is composed of the same number of bones in them all. The brain is but feebly developed, the *cerebellum*, or hinder brain, being the larger of the two. Sensation, therefore, may be pronounced to be weak throughout the whole class.

The senses of fishes are all very imperfect from the same cause. The nostrils are simple cavities, with *laminæ* disposed in the interior, of a radicated form; but the olfactory nerves, or smelling, possess but little power. The eyes have a very flat *cornea*, with scarcely any aqueous humour; but the crystalline lens is almost globular, and very hard. The eyes are also large in proportion to their size, and are destitute of eye-lids. The sight, therefore, of fish, excepting when very near the surface, must be

imperfect. Neither can the hearing of fishes be very acute, since they possess no external ear, and the construction of the inner ear is of the simplest form. The sense of taste in fishes must also be far from delicate. Their tongues are often bony, and furnished with teeth, or other hard covering; they are also destitute of salivary glands; and for the most part swallow their food without mastication. The body of fishes being covered with scales, and destitute of all organs of prehension, their sense of touch must likewise be very imperfect.

The teeth of fishes present many varieties. Some are without them altogether; in others, the jaws are so hard, that they form a kind of solid beak; in others, the teeth are pointed, edged, or flat; while in others, they are placed on the lips, the jaws, the palate, the tongue, the gullet, or on all these parts at the same time.

The sexes in fishes are generally found in separate individuals. The *ova*, or spawn, being impregnated by the male after extrusion, the season of love can therefore hardly be said to exist, and the care of a parent unknown, since the young are, from the earliest period, left unprotected. Internally, the male fish is known by the *milt*, or soft roe; and the female by the *spawn*, or hard roe, both of which occupy the same relative place in the body of the animal. Some fishes are viviparous; but all appear equally regardless of their infant progeny.

The reproductive powers of fishes are truly amazing. In the ovary of a single cod, 3,686,760 *ova*, or eggs, have been counted; 1,357,400 in a flounder; 36,960 in a herring; and 383,252 in a

tench.—(*Phil. Trans.*, vol. lxvii.) M. Blach relates that four male, and three female carp, being placed in a pond of seven acres, the increase during one season was found to be 110,000. But the astonishing increase of fishes becomes modified in a variety of ways; thus regulating the number produced to the supply of food. Myriads of these *ova* form the food of different species of fish; myriads more of the young are destroyed in an element where almost all are destined to become the prey of one another, or of aquatic birds, and reptiles. Notwithstanding these deductions, fish form an important object of commerce, as a supply of food, and hold out an inexhaustible field for the enterprise of nations, whose territories approach the sea. The fisheries of Great Britain have never yet received that general patronage which they demand.

Of the causes which prompt the annual migrations of fishes on certain coasts, but little is known with certainty. The probability is, that they are regulated in these by the same causes which influence birds; that is, a search after food, and proper places for reproduction.

Of the comparative age of fishes it is difficult to speak. Carp and pike have been known to reach the age of more than two hundred years. It is probable that those monsters of the deep—whales, would arrive at an age still more considerable, if left undisturbed.

Fishes are divided into two series, the *Acanthopterygii*, or bony fishes, and the *Chondropterygii*, or cartilaginous fishes: in the former, the skeleton is formed of true bone; while in the latter, it always

remains in a state of cartilage, or gristle. The osseous, or bony fishes, make three-fourths of all the fishes known, and are the most perfectly wrought type of the class.

Fish, though often mentioned in the Bible, yet no one particular kind is ever specified.

CLASS III.—PISCES, OR FISHES.] [SERIES I.—OSSEI, OR BONY FISHES.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY I.—PERCOIDES.

THE PERCH.

The Common Perch (*Perca fluvialis*) is known to most of our readers, and may be regarded as the type of this family. Its body is oblong, and covered with hard scales; the gills are spiny; and the jaws and palate furnished with teeth. It is of a brownish-olive colour; the first dorsal-fin a little longer than the second; the other fins, and tail, are red. This fish is found throughout nearly the whole of Europe, in the larger rivers and lakes; but attains the largest size in Russia. The average length is about two feet, and from four to five pounds in weight. A perch has been caught in the Serpentine River, Hyde Park, which weighed nine pounds. The perch is a rapid swimmer, and is generally found near the surface. The female deposits her spawn in the spring. It is pre-eminently voracious, devouring young and weak fish, together with lizards, frogs small snakes, and all kinds of aquatic insects;

gnats and flies are ever being pursued by it with avidity.

The Pike Perch (*Perca lucioperca*) is a fine variety, resembling both the pike and perch. Its sides are silvery, and belly white; the pectoral fins yellowish. It is found in northern Europe and Asia, especially in the Danube, where it is sometimes taken of twenty pounds weight. Its growth is very rapid, where food abounds; but it is proverbially voracious and gluttonous. Great numbers of these fish are destroyed by water-fowl, who plunge after them to the very depths of their favourite retreats.

The Sea Perch (*Serranus hexagonatus*), though closely allied to the perch family, yet differs from it in having only one dorsal fin, and the operculum one or more angular projections. It is found in the Mediterranean, and in the seas of temperate and warm climates. The sea perch is a beautiful fish, and in considerable repute.

The Red Mullet (*Mullus barbatus*) deserves notice, having had for ages the misfortune of being known for its personal beauty and savoury qualities, which excited human luxury, cruelty, and folly. The Romans were accustomed to enclose these fish in vessels of crystal over a slow fire, and place them on their tables, for the fiendlike pleasure of witnessing the lingering sufferings of their victims, as the water gradually increased in heat. If Suetonius is to be believed, 30,000 sesterces have been given for three mullets. This fish is of a fine red colour on the back, with a silvery belly. It is found in all European seas.

SHAD AND PERCH.

FLYING FISH.

THE MAILED-CHEEKS.

This family contains a numerous series of fish, to which the singular appearance of their head, variously bristled, and covered with armour, gives a peculiar physiognomy, and has caused them to be classed in special genera, although much resembling the perch.

The Sapphirine Gurnard (*Trigla propria*) may be regarded as the type of this family. It is often seen in our markets; is of a bluish colour, and common in all European seas. Its length is about twelve or fifteen inches. It is extremely voracious, feeding chiefly on sea-snails. The gurnard comes into shoal water about May or June, when its eggs are deposited.

The Flying Gurnard (*Trigla volitans*) is an extraordinary variety in this family. These fish abound in the Mediterranean, and in all the intertropical seas, affording much pleasure to the spectator, by their repeated flights at particular times, especially on the approach of rough weather in the night; numbers of them may then be seen, by the phosphoric light which they emit, marking their arched passages in apparent streams of fire. The pectoral fins, by which the flying is effected, are longer than their whole body, and are supported by articulated rays, something like those of the wings of the bat. This flight is by no means continuous, seldom

extending over a larger space than perhaps 120 feet; and often so elevated, that the fish will sometimes fall on the deck of a large vessel. Neither is it for their own pleasure, or amusement, that they quit their natural element. Few creatures seem to be beset with more enemies than the flying-fish, and which seek refuge in their temporary flight: if they thus escape one class of enemies, they frequently become victims to the sea-birds, which are hovering over, and ready to pounce upon them. The flying-fish feed on small shell marine animals, or mollusca, whose covering they break by means of their obtuse teeth.

The Japan Mailed-cheek (*Monocentris Japanica*) forms a singular genus, having not only the cheek mailed, but the entire body also, which is short and thick, covered with enormous and rough scales. Four or five thick spines stand in the place of the first dorsal fin, and the ventrals are composed each of an enormous spine, in the angle of which are hidden some soft rays, almost imperceptible. The head is thick, and shielded. There are also eight rays to the gills. This extraordinary fish has hitherto been found only in the seas of Japan.

To the same family must our Stickleback (*Gasterosteus*) be referred, being the smallest of the fresh-water fish, and nearly the most common. Its name is derived from the long dorsal spines, and osseous cuirass, with which the under part of its body is furnished. These fish are very numerous, especially in the fens of Lincolnshire. Their increase is rapid, although, from the large size of the eggs, many cannot be laid at one time. They have

little to fear from other fish, being so completely enwrapped with armour. Sticklebacks are extremely agile, often leaping vertically more than a foot out of water. Their voracity is excessive. Accordingly, no fish should be extirpated from ponds with greater care, from the injuries which they commit, although their extirpation is often extremely difficult. They are widely spread throughout Europe. In colour they are not unlike a mackerel, the belly having a hue of crimson.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY III.—SCIÆNOIDES.

THE MAIGRE.

This family, besides their resemblance to the *percoides*, have their teeth different; some have two dorsal fins; others, but one. The natatory bladder is often peculiar; and the stones of the ear are larger than in most fish.

The Maigre (*Sciæna aquila*) is a fine fish, and not uncommon in the Mediterranean and other seas. It is sometimes, though but seldom, caught in the British Channel; is of large size, many of them a yard long; very strong, and considered good for the table. The body of this fish is of a silvery-grey colour. When they swim in shoals, they send forth a loud buzzing noise.

Allied to this family is the Johnius, a small fish,

which the sea and rivers of India furnish to the inhabitants. The flesh is white, light, and of little flavour. The English at Bengal are accustomed, from its appearance, to call it the *whiting*.

The Indian Amphiprion (*Amphiprion ephippuim*) is a variety of the same family. It is found chiefly in the Indian seas, and is more remarkable for brilliancy of colour than delicacy of flavour. The head of the amphiprion is short, much sloped and compressed; mouth small and oblique; body reddish; the back black, extending on the sides into a large black spot.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY IV.—SPAROIDES.

THE SPARUS.

The *Sparoides* greatly resemble the last described; but are distinguished by never having more than six rays to the gills.

The Common Sparus (*Boops vulgaris*) is an inhabitant of the Mediterranean Sea. Its body is elongated, and silvery-grey, banded length-wise with golden-brown streaks; the under cutting teeth dentated; the upper ones pointed. Several varieties of this fish are to be met with in the American seas. They rank among the few vegetarians of the sea, living chiefly upon marine plants. They spawn twice a-year, and approach the shore in large shoals.

The Oblada (*Sparus melanurus*) is also a Mediter-

SEA DEVIL AND LEAPING BLENNY.

ranean fish. It is met with occasionally in the north part of the Atlantic. It swims at moderate depths along the coasts, during the whole year, and the female may be seen occasionally pursued by the male, swimming with great swiftness. The body of this fish is silvery-grey, branded longitudinally with brown, and marked with a black spot on each side of the tail; the teeth in the middle are notched, the lateral ones are fine, and pointed. It is a small fish, averaging about six inches in length.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY V.—MÆNIDES.

THE MÆNA.

This family differs from the preceding, in the extreme extensibility and retractibility of the upper jaw.

The Common Mæna (*Sparus mæna*) inhabits various parts of the Mediterranean, and is taken at all times of the year. The female spawns in July and August. They are not esteemed for eating. In appearance they resemble the herring, but are of a more silvery colour.

The King-fisher of Nice (*Smaris alcedo*) differs from the foregoing, chiefly in its body being variegated with a beautiful blue colour. These fish abound so much at Ivica, that they form more than one-half of the total product of the fishery of that island. Fish of this genus, though not much esteemed for food when fresh, yet, after being salted

and exposed to the air, make a sort of *garum*, which is in great request.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY VI.—SQUAMMIPENNES.

THE SCALY-FINNED.

The fish included in the sixth family are known by their hair-like teeth, collected in close rows like a brush. The mouth is also small; the fins, both dorsal and anal, completely covered with scales. They are abundant in the seas of hot climates, and are adorned with most beautiful colours. If the hot countries of Africa and America have among their feathered tribes their humming-birds and tanagers, the intermediate seas support myriads of the finny race, still more brilliant; whose scales reflect the tints of metals and precious stones, heightened in effect by spots and bands of a more sombre hue, and distributed with a symmetry and variety equally admirable. The Ornamented Chætodon (*Chætodon ornatus*) gives ample proof of this fact.

The Archer (*Toxotes jaculator*) deserves notice, from the peculiar instinctive ingenuity it possesses of procuring winged insects by shooting at them with drops of water. Although the mouth of this fish does not seem to differ from that of its congeners, yet it knows how to shoot drops of water to a great height, three feet and upwards, and to reach, almost without failing, the insects or other little animals

which creep on the aquatic plants, or even those which grow upon the shore. The inhabitants of many countries of India, especially the Chinese of Java, rear these fish to amuse themselves with their manœuvres, and present them with ants or flies on threads and sticks within their reach. This fish is from six to eight inches long; the body of a yellow colour, with brown spots on the back; the first spines of the dorsal, anal, and ventral fins are very strong.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY VII.—SCAMBEROIDES.

THE MACKEREL.

The family of which we are about to treat is one of the most useful to man, from their good flavour, inexhaustible reproduction, and periodical visits to the same latitude. This species is distinguished for its small scales, smooth body, and powerful caudal fin, making them excellent swimmers.

The Common Mackerel (*Scomber scombrus*) has a blue back, with wavy black stripes, and five spurious fins above and below. It abounds in summer on our coasts, being then almost as numerous as herrings. It is remarkable that the mackerel has no natatory bladder. Where the mackerel winters is still a mystery. Certain it is, that in the Channel, from the month of April, some small mackerel, and without milts, make their appearance; but it is only in July and August, when obviously in a migratory

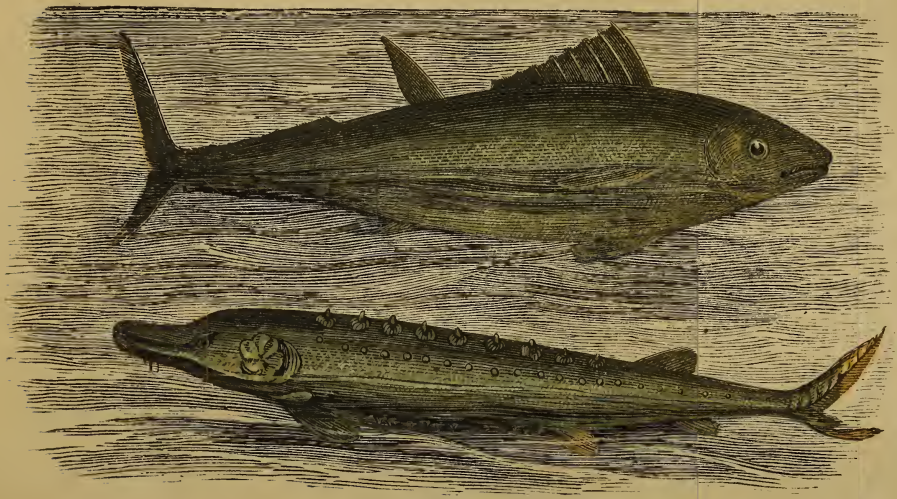
state, that they become numerous, fat, and well-flavoured.

The TUNNY (*Scomber thynnus*) is one of the largest sea-fishes, measuring from two to ten feet in length. The back is steel-colour, the sides and belly silvery, with eight or nine spurious fins.

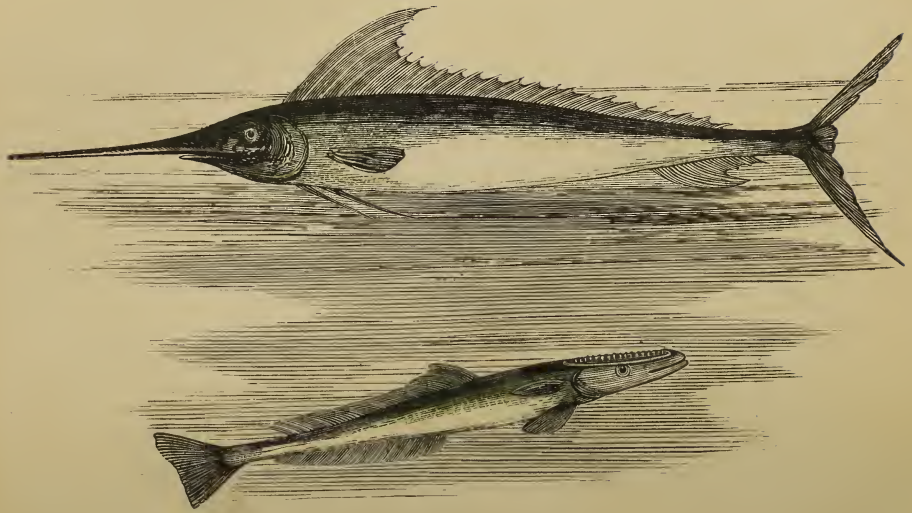
This fish was well known to the ancients, and formerly, as at present, the tunny fisheries were an object of great commercial importance. The fish is gregarious, and often appears in large shoals. Pliny relates, that the fleet of Alexander the Great was impeded by a shoal of tunnies, so closely impacted, that the ships had to make their way through them in order of battle. They are occasionally taken on the British shores, and have been frequently seen in the firths of the western coast of Scotland, in pursuit of herrings.

At the present time it is in Catalonia, Provence, Liguria, Sicily, and Sardinia, that this fishery is most actively carried on, and yields the most abundant results. The tunnies show themselves in almost all points of the Mediterranean Sea about the same time, and without the possibility of saying that they pass at first through certain tracts, and afterwards arrive at others.

Tunnies are mostly taken in the following manner: a sentinel is posted in an elevated situation, who, by a signal, gives notice that a shoal of tunnies are approaching, and from what quarter they come, when numerous boats set out under the command of a chief, range themselves in a curve line, and form, by joining their nets, an enclosure which terrifies the tunnies, and which is drawn closer and closer, by



TUNNY AND STURGEON.



SWORDFISH AND REMORA.

adding fresh nets within the first, so as always to bring back the fish near the shore. When there remain but a few fathoms of water, a large and final net is spread, which has a sleeve, that is, a bottom lengthened into a cone, and which is drawn towards the land, thus bringing along with it all the tunnies. The little ones are then taken out with the hand, and the large ones also, after they have been killed with poles. This fishery, practised on the coasts of Languedoc, sometimes yields at a single cast two or three thousand quintals of these fish.

The SWORD-FISH *(Xiphias gladius)* is found in European seas, and in company with the tunny. The snout of this fish is very long, often two or three feet, flattened, edged, and hard enough to penetrate the planks of ships; its first dorsal fin is high and pointed in front, sinking along the back, and terminated by a smaller point; the anal fin has two short points; the tail lunated; the body of a brown colour, shaded with slate-colour above, and silvery-white below. The entire length from twelve to twenty feet.

The Mediterranean Sea seems to be the peculiar habitat of the sword-fish, but it ascends considerably to the north. It is sometimes to be seen on the coasts of Spain, and occasionally on those of France. It has likewise been seen in the German Ocean and the Baltic—in the latter sea of enormous size. They usually go in pairs, the male and female together.

The fishery of the *xiphias* is precisely that of the whale in miniature. It is attacked with a small harpoon, attached to a long line, and frequently struck at a considerable distance. The superstitious Sicilian fishermen chaunt a sort of hymn in *Greek*, to entice

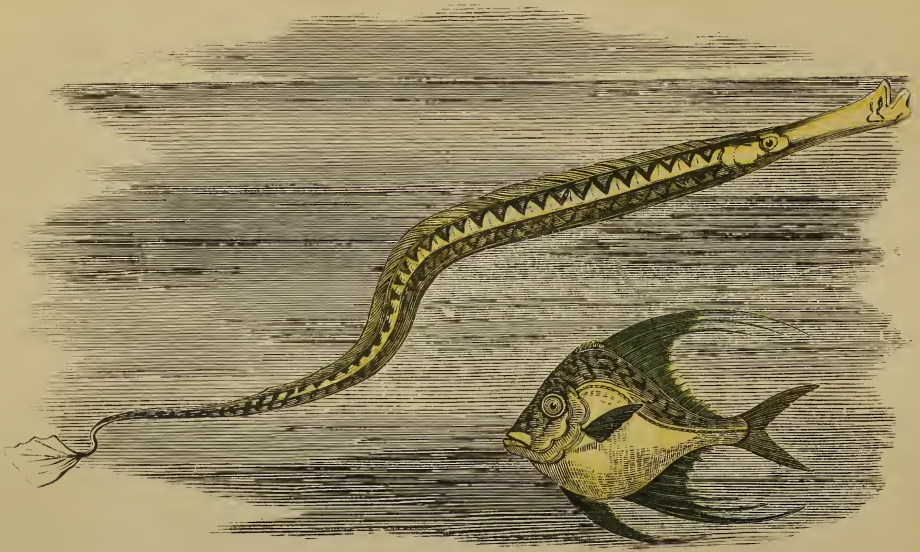
the fish to their boat, and which they believe of such efficacy, that no other bait is employed. Should the fish, however, they assert, unfortunately hear a single word in *Italian*, it would instantly dive into the water, and be seen no more.

The flesh of the young is white, and of excellent flavour.

The Sea Cock (*Gallus ægyptiacus*) is a singular variety. It has long filaments to the second dorsal and anal fins. The ventral fins are also very much prolonged, and the spines of the first are short. Teeth are found in both jaws. The length of the fish is from six to eight inches. It is an inhabitant of the Indian seas.

The Dory (*Zeus faber*) has a large head and mouth; the body of an orange colour, with a black spot on each side; the spines along the dorsal and anal fins are forked, with long membraneous filaments behind each dorsal spine. Its appearance is not very prepossessing, but it has the reputation of being exquisite in flavour. Its length is about fifteen inches. The dory inhabits the seas of Europe.

If it be true that the haddock bears the impress of St. Peter's finger and thumb, when he took the tribute-money from its mouth, it may also be believed that St. Christopher, when wading through an arm of the sea, and having caught a stray dory in his passage, left indubitable evidence of the fact on its sides, by the two opposite marks of a finger and thumb. This fish owes its reputation in England to the celebrated Quin, who, besides his histrionic powers, possessed a most consummate taste in the luxuries of the table.



THE PIPE FISH AND SEA COCK.

The Sail-bearer (*Coryphæna velifer*) is the last of the Scomberoides which we propose to notice. Its body is long, but much compressed; the teeth are in one row above and two below; scales large; the dorsal and anal fins very elevated, and of equal size; the fins are brown, with white spots.

This extraordinary fish inhabits the Pacific, the Atlantic, and the Mediterranean seas. It is the incessant persecutor of the flying-fish, forcing them to shoot out of the water, and receiving them, as it were, in its throat, the moment they fall back, after their short passage in the air. It will sometimes raise itself entirely out of water to seize a prey which is on the point of escaping. The flesh, though dry, is of an agreeable flavour.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY VIII.—TÆNIOIDES.

THE RIBAND FISH.

The fishes which compose this family have an elongated body, flattened on the sides, and with very small scales; the jaws are pointed, with long and curved teeth; the dorsal fin extending along the whole body. They have no ventral or anal fins, the tail terminating by a slender filament. The body of the riband fish (*Trichiurus lepturus*), is bright silvery; the lower jaw longer than the upper; its length about a yard. It is found in the Atlantic Ocean,

both on the coast of America and that of Africa. The lakes and rivers of South America also abound with the same fish.

The KING OF THE HERRINGS (*Gymnetrus falx*) is another variety in this strange family. Its body is long and flat, being from ten to eighteen feet long, but totally deprived of the anal fin; the dorsal fin is long, the lengthened rays of which form a sort of plume, but they are easily broken; the ventrals are also very long; the caudal, consisting only of very few rays, rises vertically from the extremity of the tail, which ends in a small hook. There are six rays in the gills; the mouth is slightly cleft, is very protractile, and furnished with but few and small teeth. These fishes are extremely soft, and their rays very fragile. Some specimens, taken in the Mediterranean Sea, have had a hundred and fifty dorsal rays, or even more. They are also found in the Arctic Ocean, as well as in that of India. The *gymnetrus* is said either to precede or accompany the shoals of herrings, from which it has acquired the popular name of *King of the Herrings*

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY IX.—THEUTYES.

THE SPINE FISH.

THIS family are all foreign, inhabiting, for the most part, the Indian seas. They have an oblong body; a small mouth, not at all protractile; each jaw fur-

nished with a single range of trenchant teeth; the palate and tongue without teeth, and a single dorsal fin. The Surgeon (*Chætodon chirurgus*) has a strong moveable spine on each side of the tail, which is sharp as a lancet, and inflicts severe wounds on those who carelessly handle these fishes; hence their name of *Surgeon*. They are not numerous, but considerable variety exists amongst them, some having a very high dorsal fin; others a sort of brush, composed of stiff hairs before the lateral spine; others, again, have the teeth deeply notched on one side.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY X.—LABYRINTHIFORM PHARYNGEALS.

THE WATER-BEARERS.

Fishes of this family are known by a peculiar organization, by which water can be retained to moisten the gills when the fish is on dry land. This singular property induces the common people of India to believe that these fishes fall from heaven. They inhabit the Indian seas. The Spotted Serpent-head (*Aphicephalus serpentinus*), will suffice as an example. This fish, from the provision beforementioned, will creep to a considerable distance from the water. The mountebanks and jugglers with which India abounds, often carry fishes of this kind about with them, to amuse the populace by their movements. They are also so tenacious of life, that they may be cut to pieces without being killed at

once, and are often thus sold alive, by slices, in the market; nor do they sell at so high a price when so much of them is cut off that the rest ceases to move. The flesh of this fish, though light, easy of digestion, and of tolerable flavour, is not served on the tables of Europeans, but is eaten by the Indians only.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY XI.—MUGILOIDES.

THE MULLETS.

The head of the fish in this family is depressed, broad, and scaly; the ventral fins being under the abdomen; two short distant dorsal fins, of which the first or spinous is farther back than the ventrals, and the second answers to the anal; the mouth is furnished with fleshy and notched lips; the lower jaw keeled in the middle; no teeth, and a branchial membrane with three rays. The body of the Common Mullet (*Mugil cephalus*) is of a grey colour, banded lengthwise with brownish parallel lines; the belly silvery; fins bluish. It inhabits the European, Indian, and Atlantic seas. This fish was highly esteemed by the ancient Romans, and is still much eaten in the southern countries of Europe. Its average weight is about ten pounds. A kind of *caviar* is made of the roes, which is regarded as a luxury for the table.

Toward the commencement of summer, mullets, excited by the necessity of living in fresh water,

approach the shore, and advance towards the mouths of rivers, forming such numerous troops that the water through which they are seen, without being clearly distinguished, appears to be bluish. This particularly happens in the Garonne and Loire at this period. They are then taken with nets in large numbers. The flesh of the mullet is tender, and of good flavour. It is thought to be better when taken in fresh water.

The Mountain Mullet (*Mugil manticola*) is a beautiful variety, and is a native of Jamaica.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY XII.—GOBIOIDES.

THE GUDGEONS.

The distinguishing characteristic of this family is their slender and flexible dorsal fins.

The Leaping Blenny (*Blennius saliens*) will serve as our first illustration of this family. Their ventral fins are placed before the pectorals, and composed of only two rays. They associate together among the rocks near the shore. The skin is covered with a mucous secretion, whence they derive their generic name. Many of this family are viviparous. The leaping blenny approximates to the flying-fish in the length of the pectoral fins, which assist it in shooting forth, and gliding swiftly over the surface of the water, and in escaping from the tops of the rocks, where it is sometimes found dry, and whence it darts, by numerous and rapid leaps, into the middle of the waves.

The Sea Gudgeons (*Gobii*) have a round head, with tumid cheeks; two dorsal fins, the posterior long; the ventral fins unite towards their base into a hollow disk; the branchial membrane has four rays. They are in general but of small size, and are usually found in shallow water. They can live for a considerable time out of the water. Some are viviparous, and the greater part are provided with a swimming bladder. They are natives of the Indian seas. Broussonet's Gudgeon (*Gobio Broussonetii*) forms a singular variety. The River Gudgeon (*Gobius fluvialis*) is too well known to require any description.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY XIII.—PECTORALES PEDICULI.

THE HAND-SWIMMERS.

The first specimen of this singular family is the Sea Devil (*Lophius piscatorius*). Its head is extremely large and rounded; the pectorals supported as by two arms; the mouth is extremely wide; the body brown, with variations; the ventral fins are short and stiff; two or three long tentacula are on the top of the head, and the sides are fringed with similar processes; their length from two to seven feet. It inhabits the seas of Europe; is thought in appearance to resemble the tadpole, and hence often called the frog-fish. It frequents shallow water, lying in ambush for its prey, consisting of smaller fishes, half buried in mud, or covered by sea-weeds. If the

Devil be ugly, like the *lophius*, he certainly has few claims to beauty.

The Hand-swimmers (*Chironectes*) as their name implies, have the singular property of living out of water for two or three days, creeping on land almost like quadrupeds, and which they are able to do from the peculiar construction of their pectoral fins, which perform the office of feet. They inhabit the seas of warm climates. The *Chironectes lustria* is remarkable for its capability of suddenly swelling out its abdomen, and changing its figure, as it were by will. It is found in the seas of Brazil and China, and is only about nine or ten inches in length.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY XIV.—LABROIDES.

THE DOUBLE LIPS.

The Wrasse *(labrus)* forms a numerous genus. These fish are oblong; their lips double and fleshy, whence they derive their name; their branchiæ are crowded with fine rays; their teeth conical: they also have a strong natatory bladder. "Nature," says Count Lacepède, "has granted to the *labri* neither size, nor strength, nor power, but they have received as their share of her favours agreeable properties, agile movements, rapid oars, and are adorned with all the colours of the rainbow. The most varied shades, and lively hues, have been lavished upon them. They feed principally on sea-snails, and prefer the

neighbourhood of rocks, not subjected to the dashing of the waves." The Mediterranean Sea presents several beautiful varieties. The GIBBOUS WRASSE *(labrus gibbus)* may serve as an example.

The only variety which requires farther notice is the SEA-PEACOCK *(coryphæna plumieri.)* This fish is found in the French Antilles. It is remarkable for its beauty of colouring; the body being gold-colour, irregularly and transversely streaked with violet; it has also a crescent-shaped tail.

ORDER I.—ACANTHOPTERYGII, OR PRICKLY-FINNED.

FAMILY XV.—FISTULARIÆ.

THE PIPE-FISH.

THE name of this family is derived from the elongated or pipe-like shape of the fishes of this class. Their jaws are very narrow, much produced, and tubular; the teeth small; the fins minute, and between the lobes of the tail a filament is sometimes found as long as the body; the branchial membrane has seven rays.

The body of the SLENDER PIPE-FISH *(fistularia tabacaria)* is smooth, the scales being imperceptible; of a liver colour, marked above and on the sides by a row of blue and greenish spots intermixed; the tail bifid, with a long bristle in the centre, tapering to a point.

The fishes included in this division are found in the seas of hot climates, of both hemispheres.

1 ROACH.—2. CARP.—3. BREAM.

THE CARP.

This order of fishes is distinguished by the ventral fins being behind the pectorals; and the rays, unlike the families already described, are soft or articulated.

The Carp *(cyprinus carpio)* inhabiting almost all our rivers, lakes, and ponds, scarcely requires description. It is known by its small toothless mouth, and the three flat rays of the branchiæ. The tongue is smooth, but a powerful instrument of mastication is found at the entrance of the throat, having some large teeth, and a stony disk, against which the food is pressed. Carp spawn about May, are very prolific, and live chiefly on vegetables. They are widely scattered throughout the river of Europe, but delight most in waters where the current is not strong. Carp thrive equally well in ponds, burying themselves in the mud during winter. They are sometimes caught of very large size; the largest ever known was taken, in 1711, at Bischofshause, near Frankfort, on the Oder; it weighed seventy pounds, and was nine feet in length. Carp often live to a great age; many have been known to live for more than 150 years. Like fish generally, they can remain a long time without eating, although when opportunity serves, they take food in abun-

dance. The flesh of the carp is in high estimation for the table.

The Gold-Fish *(cyprinus auratus)* forms an interesting family variety. They were originally from China, having been first brought from that county to Europe in the year 1011. They have now become almost indigenous to South Britain. A river stream in this country is too cold for them, although they abound in the rivers of China. With us, they are reared chiefly in stagnant water. The frosts of winter, provided that the ice of the pond where they may be is broken, do not injure them. Many persons keep them in vases; but this can only be done for a time. The water should often be changed, and in warm weather especially, they should be removed at night from the vase with a landing net, and placed in a large tub of water. But little food is required for them while in confinement. On the approach of May, the spawning season, they should be put into a pond, otherwise they will be almost sure to perish. They increase very rapidly when in a situation which suits them; and they have the power of controlling the population, so that the pond never becomes overstocked, even though no fish are removed from it. When in ponds the gold fish are fond of being fed with bread, or other vegetable substances, and by this means may be brought, almost at any time, to the surface of the water, excepting when the weather be very windy or cold. The young fish, for a year or two after birth, are of a slate-colour; and it is known that they gradually assume their gay liveries of gold and silver, although the precise time and manner

THE GLOBE DIODON.

PIKE AND SEA PIKE.

have never yet, we believe, been determined. Frogs, efts, and sticklebacks, are great enemies to them, and should be removed.

The Tench (*tinca*) also belongs to this family. It is a beautiful and hardy fish, widely scattered throughout the whole globe, and will multiply in any stagnant and muddy water. They bear the cold without injury, grow rapidly, and increase amazingly.

The Bleak (*cyprinus alburnus*) is a fish well known to cockney fishermen, who are accustomed to *noble nibbles* in the river Lea. Its body is narrow, silvery, and brilliant; the fins of a pale colour. This fish is very abundant throughout Europe. Not being much bigger than a sprat, the patient fisherman will do well, the moment a bleak is caught, to throw it into the water, for the purpose of growing larger.

ORDER II.—MALACOPTERYGII ABDOMINALES, OR SOFT-FINNED FISHES.

FAMILY II.—ESOCES.

THE PIKE.

Few fish are better known than the Common Pike (*esox lucius*). It is one of the most voracious of fishes, and one of the most destructive also. Its flesh is good, and easy of digestion, because never fat. It is remarkably quick of hearing, a fact which was noticed by Pliny. The air-bladder of the pike is very large, which allows it to traverse great

spaces with the rapidity of lightning, and against the currents of the most impetuous rivers. The pike of Germany and Switzerland are much more in request than those of Italy, consequent, probably, upon the difference of climate. This fish has well been designated "the shark of fresh waters," where it reigns a devastating tyrant. To this marauder nature has likewise accorded length of years; for ages it terrifies, agitates, pursues, and destroys the feeble inhabitants of the waters. This warrior has not merely been gifted with strength, size, and numerous weapons, but it has also been adorned with elegance of form, symmetry of proportion, and variety and richness of colour.

The pike is never seen in the sea but by accident: in the streams, rivers, lakes, and ponds of Europe, Asia, and America, especially in the northern parts, it abounds. It feeds alike upon frogs, serpents, rats, young ducks and other aquatic birds, as well as upon fish. A large pike in the Rhine once seized with its teeth the under lip of a mule that was drinking, and did not let go until the animal had removed to some distance from the water.

The pike will grow to the length of from six to nine feet, and attains the weight of eighty or a hundred pounds. It grows most rapidly; in the first year it often attains to a foot in length; in the sixth it has been known to measure six feet.

The Sea-Pike, or Garfish (*esox belone*) does not essentially differ in appearance from the fish just described, but is smaller. About two feet is its average size; it is of a green colour above, and white underneath. It is said to be good eating, although

a prejudice prevails against it on account of its colour: the bones are of a finer green colour than the skin. The garfish is found on our own coasts; and kindred species seem to abound in all seas. Its bite is said to be dangerous, if not poisonous.

ORDER II.—MALACOPTERYGII ABDOMINALES, OR SOFT-FINNED FISHES.

FAMILY III.—SILUROIDES.

THE SILURES.

This family is distinguished from all others, by having no true scales, but only a naked skin, or large osseous plates. The dorsal and pectoral fins have almost always a strong articulated spine for the first ray. This articulation is so constructed, that the fish can, at pleasure, approximate it to the body, or fix it perpendicularly in an immoveable position. It then constitutes a dangerous weapon, and capable of inflicting severe wounds. These fishes abound in warm climates.

The Seat-Fish (*silurus glanis*) is the largest of the fresh-water fishes of Europe, and the only one of this singular genus in this quarter of the globe. The body is smooth, greenish-black, spotted with black; yellowish-white underneath. It is sometimes upwards of six feet long, weighing as much as three hundred pounds. This disagreeable creature conceals itself in the mud, to lie in wait for its prey. It is found in the rivers of Germany and Hungary.

FAMILY IV.—SALMONIDÆ.

THE SALMON.

This family is characterized by a scaly body, with a first dorsal of soft rays, followed by a second which is small and fat, but unsupported by rays. Almost all this family ascend rivers. Their flesh is excellent; their teeth ranged, both in the mouth and throat, so that they are the most completely dentated of all fishes. Their natatory bladder extends from one end of the abdomen to the other.

The Salmon (*salmo salar*) is one of the largest and most valuable of the finny tribe. Its flesh is red, and therefore not very digestible; its skin variegated with brown spots. It migrates from the Arctic seas, whence it enters the rivers in large shoals, in spring. Its mode of life is most remarkable. It is born in the fresh water; grows in the sea; takes refuge in the ocean during winter; passes the summer in rivers, and ascends towards their source. It traverses with facility the whole extent of the longest rivers. Through the Elbe, it proceeds as far as Bohemia; by the Rhine, it arrives in Switzerland; by the Maragnon, whose course is nearly 800 leagues, it attains to the lofty Cordilleras of South America. In ascending rivers, salmon always proceed in long bands, disposed in two lines, which form the sides of a triangle, the summit of which is occupied by the largest female, who leads the van; the smaller fish constitute the

SALMON AND TROUT.

rear-guard. In the event of this order being interrupted, it is renewed as quickly as possible. They swim with great noise, in the middle of the river, and near the surface of the water. When any obstruction occurs, great efforts are made to overcome it. With one of their sides resting upon some large stones, they approximate the extremity of the tail to the mouth, catch it with their teeth, and thus form an arch which constitutes a powerfully tense spring, this they let go with inconceivable rapidity, strike the water with violence, and spring to a height of twelve or fifteen feet in the air. When alarmed, they swim with immense rapidity, giving a rate of at least 86,400 feet in an hour.

Their ascent in the rivers is for the purpose of spawning. The provident mother having selected a place, will often dig an elongated hole of perhaps eighteen inches in length, where, having discharged her burthen, she then covers it with sand. The male afterwards fecundates the spawn, generally during the night. Towards the end of autumn, exhausted and feeble, they descend to the sea. The young grow rapidly, gaining the sea when about a foot long. Their numbers surpass all reckoning. In Norway, a single cast of the net sometimes furnishes more than three hundred fishes; and in the Tweed will often bring more than seven hundred. Yet salmon possess little tenacity of life, dying almost instantly on being taken out of the water.

The Common Trout (*salmo fario*) is a much smaller fish than the salmon, with brown spots on the back, and red in the flanks, yet much varying from white and golden yellow, to a deep brown; the

flesh is white. The trout is common in all streams, where the water is clear and lively. The praises of the trout are in every angler's mouth.

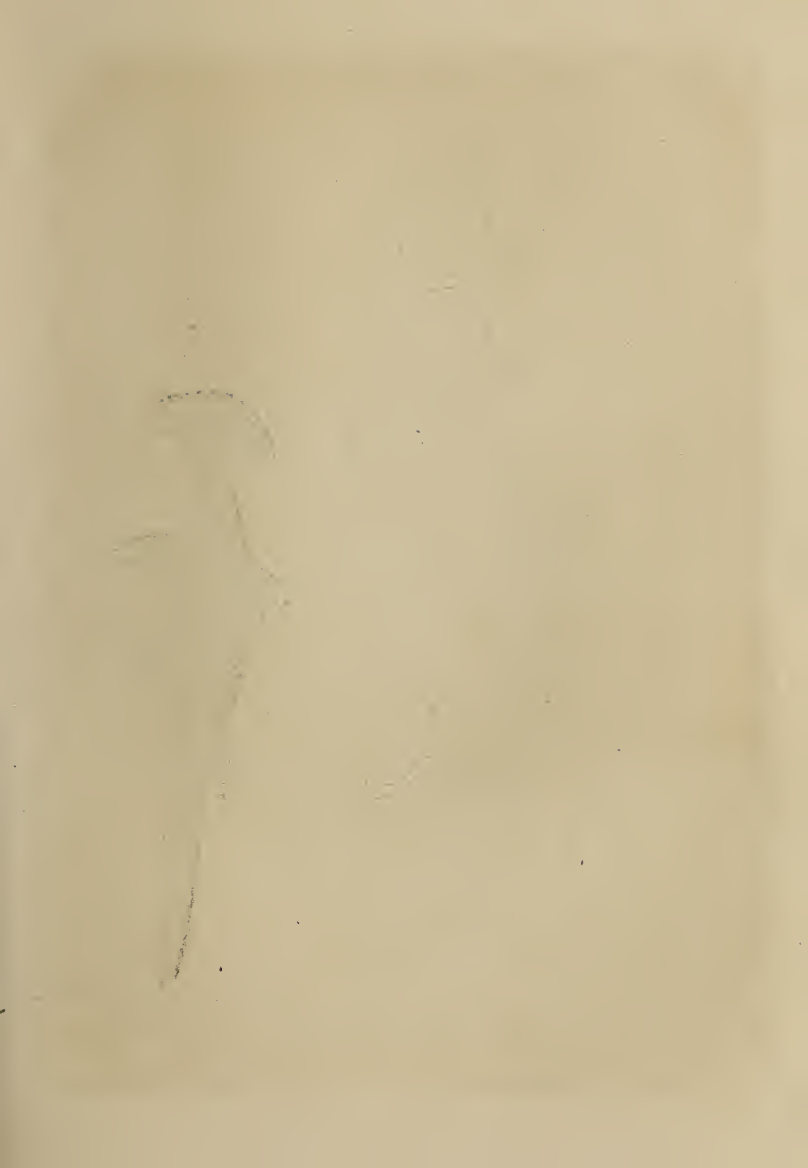
ORDER II.—MALACOPTERYGII ABDOMINALES, OR SOFT-FINNED FISHES.

FAMILY V.—CLUPEA.

THE HERRING.

The gills in these fish are very much cleft, so that they instantly die on being taken out of the water. The natatory bladder is both long and pointed. Of all fishes, their bones are the finest and most numerous.

The Common Herring (*clupea harengus*) is a fish universally known. It swims with considerable strength and agility, and feeds on the eggs of fishes, on crabs, and worms. Each year, in summer and autumn, these celebrated fishes proceed from the North, and arrive on the western coasts of Europe in innumerable legions. They also spread themselves over certain shores of America, and on the northern coasts of Asia. Common as herrings are, we know but little of their history; whence they come, or whither they go. At whatever period the herrings abandon their winter sojourn, they proceed in troops, which are preceded by some isolated males, generally a few days in advance. Considerable agitation exists amongst them during the time of spawning. Our knowledge of the time when the spawn of the herring discloses the young, and the period which is



WHITE AND HAMMER-HEADED SHARKS.

necessary to attain its maximum of size, is very imperfect. The usual length of the herring is about ten inches. It multiplies astonishingly; sixty-eight thousand six hundred and six eggs, have been reckoned in a single female. The innumerable legions of herrings, though covering an immense extent in the sea, yet proceed in regular order, rank and file. Tens of thousands of them fall a prey to larger fishes, and sea birds; multitudes perish by their crowding into bays and shallows, where they are suffocated, or crushed to death. Millions of them likewise fall into the nets of fishermen during their passage. The Swedes alone are known to take of these fishes annually, more than four hundred millions; which yet bears no proportion to the myriads taken by the fishermen of Holstein, Mecklenburg, Pomerania, France, Ireland, Scotland, England, the United States, Kamschatka, and perhaps above all, by Holland. Notwithstanding all these sources of destruction, the number of herrings never seem to diminish. It is only of late years that the salting of herrings has taken place in England and Scotland, on a large scale; and even now this branch of commerce does not receive that support which its importance demands. Herrings are not found in the Mediterranean, or in any of the southern oceans.

To this same family belong the Sprat (*clupea sprattus*); the White Bait (*clupea alba*); the Pilchard (*clupea pilchardus*); the Sardine (*clupea sardina*); the Shad (*clupea alosa*); and the Anchovy (*clupea encrasicolus*).

The Sprat has the proportions of the herring,

and is a rich pleasant fish, for a healthy stomach, either fresh or salted.

The WHITE BAIT is regarded as one of the dainties of the table. It is a very small fish of the finest silvery colour, with a small black spot on the end of the muzzle. It is regularly found in our rivers on the approach of summer, though its history continues to be one of the mysteries of nature.

The PILCHARD nearly resembles the herring in size, but the scales are larger. Its fishery precedes that of the herring, and particularly so on the western coast of England.

The SARDINE greatly resembles the pilchard, excepting in its smaller size. It has the reputation of extreme delicacy of flavour. Large quantities are preserved by the Brittany fishermen, both in oil and butter, for exportation. Numbers of these fish are taken in the Mediterranean.

The SHAD is much larger and thicker than the herring, being taken nearly a yard in length. It has no perceptible teeth. In spring it enters the rivers, when it is excellent eating. If taken in the sea, it is dry and ill-flavoured.

The ANCHOVY differs in appearance from the herring, and is less in size. The back is of a bluish brown colour, and the belly silvery. Innumerable quantities of anchovies are taken in the Mediterranean. The head and intestines being removed, the body of the fish is preserved, and is extensively used as a sauce, or seasoning.

ORDER III.—MALACOPTERYGII SUBBRACHII, OR FISH WITH VENTRAL FINS UNDER THE PECTORALS.

FAMILY I.—GADOIDES.

THE COD.

THE Gadites are recognized by the ventrals being attached under the throat, and sharpened to a point. Their body is long, and covered with soft scales; the head without scales. All their fins are soft; the jaws being armed with several ranks of small curry-comb teeth; their gills are large, with seven rays. Almost all have two or three dorsal fins; one or two behind the *anus*, and a distinct caudal fin. They also possess a large air-bladder. They live in cold or temperate seas, and constitute most important resources in their fishery.

COD (*gadus morrhua*) are from two to three feet in length, with the back spotted yellow or brown. They inhabit the northern seas, and multiply to such a degree that whole fleets are engaged in catching them. When salted and dried, all Europe, and the Colonies, are supplied with them. The cod fishery began about the tenth century, by Gaspard de Corte Real, a Portuguese, who cast anchor, for the first time, amidst fogs and storms, upon the savage and sterile island of Newfoundland, and has proved, in the hands of the industrious fishermen of Europe, a far greater source of wealth, than all derived from the mines of Potosi. The weight of the cod varies from twelve to a hundred pounds. It is most voracious, and has digestive powers almost sufficient to dispose of wood and iron. It is an

omnivorous feeder. Its growth is most rapid; frequents salt water alone, remaining in the depths of the sea, and never approaches the shore but at the spawning season. The cod is found in the seas of Greenland, Iceland, Norway, Denmark, Russia, Sweden, and Prussia; in the British Channel, near the Orkneys, at New England, and Cape Breton, but more especially at Newfoundland, where, for a hundred leagues in length, and sixty in breadth, the cod assemble in astonishing numbers, about the month of March. On the European coasts these fish appear about a month earlier. No fish is so valuable for preservation as the cod; and hence its consumption is extended throughout the world. Less perhaps is eaten in England than elsewhere, in proportion to the population, the English not being a fish-eating people. Every part of the cod is useful. The tongue, whether fresh or salted, is a delicacy; the gills are employed as baits for fish; the liver furnishes an enormous quantity of oil, which of late years has been extensively used as medicine; the swimming-bladders are converted into isinglass; the head, when the fish is salted, supplies the fishermen and their families with food; the flesh of the cod mixed with sea-weed, is given by the Norwegians to their cows, for forcing the milk; the bones even are given to the cattle by the Icelanders, and to the dogs, by the Kamtschatdales; they are also used for fuel; the intestines and eggs of the cod rank amongst the luxuries of the table.

The cod fishery is of vast importance in every commercial country, employing an immense amount of capital for fitting out ships, and the payment of sea-

men engaged in the trade. Nothing perhaps has tended more to the improvement of our naval power than the Newfoundland fishery.

The annual destruction of these fishes by man almost exceeds belief. According to the report of the unfortunate Roland, made to the French Convention, it appears that in the first six months of the year 1792, there issued from the ports of France for the cod fishery alone, 210 vessels, carrying altogether 191,153 tons; that every year more than 6,000 vessels of all nations are occupied in this fishery, and bring back more than 36,000,000 cod, salted or dried. But the mystery is explained, when we come to know, that each mother cod can annually give birth to above nine millions of young.

The HADDOCK (*morrhua æglefinus*) greatly resembles the preceding species. It comes annually, in the months of February and March, towards the shores of Northern Europe. It is found neither in the Baltic or Mediterranean. The tradition, therefore, that this fish continues to bear the impress of Saint Peter's finger and thumb, is a stupid and lying legend, since this fish is not found in any sea to which the apostle had access. This remark might have been omitted, but for the many attempts which are now making to revive old superstitions.

For the last century, shoals of haddock have arrived on our coast, between Flamborough Head and the mouth of the Tyne, in December, and are then taken in considerable number. The haddock is no less gluttonous and destructive than the cod, feeding on smaller fishes and crustacea. The large haddock are taken only in winter. The quality

of the flesh of this fish considerably varies. In general it is white, firm, and good: fish caught in May and June are preferred. It is salted like the cod, but is much inferior. The Ling (*lota molva*) is but another variety.

The Whiting (*merlangus vulgaris*) is chiefly found in the northern seas of Europe. It is caught nearly throughout the year, around England and Holland, either by line or net.

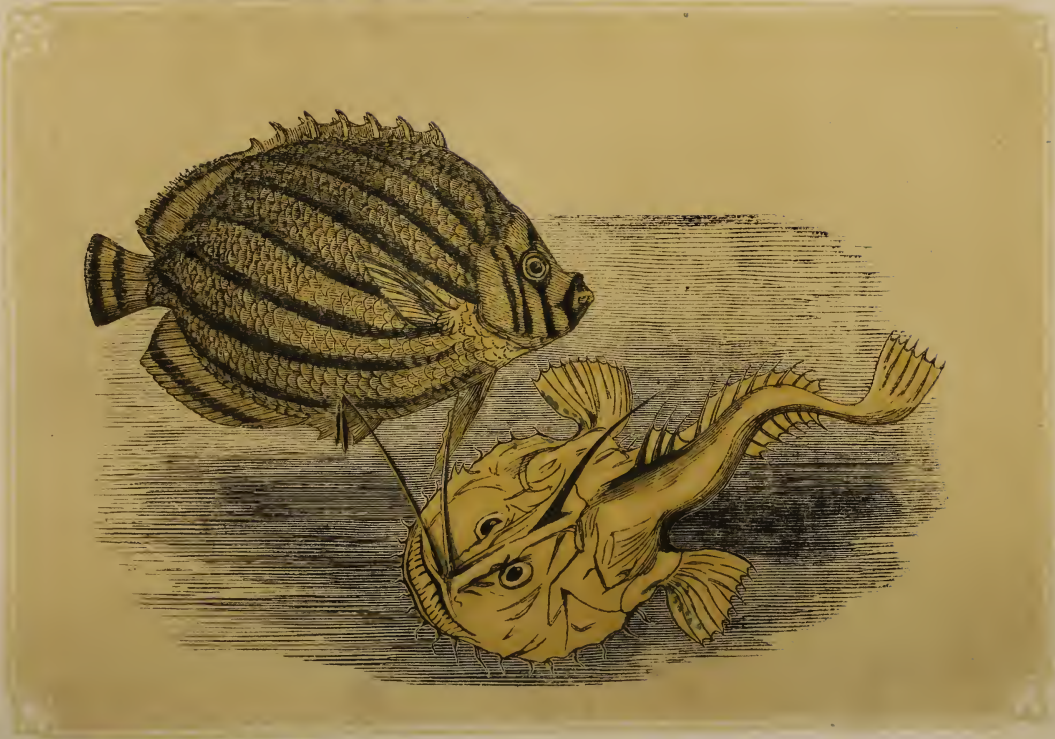
ORDER III.—MALACOPTERYGII SUBBRACHII, OR FISH WITH VENTRAL FINS UNDER THE PECTORALS.

FAMILY II.—PLEURONECTES.

FLAT FISH.

This family is unique amongst fishes, having both eyes on the same side, remains uppermost when it swims, and is of dark colour; the belly is white. Such fishes seldom quit the bottom, having no natatory bladder. The Plaice (*pleuronectes platessa*), the Flounder (*pleuronectes flesus*), the Halibut (*pleuronectes hippoglossus*), the Turbot (*pleuronectes maximus*), the Brill (*pleuronectes rhombus*), and the Sole (*solea*), all belong to this family, and are found in the northern seas. The Turbot, though extremely voracious, seldom attacks anything but living prey, or what is quite fresh. Its flesh is white, fat, flaky, and delicate. The Sole is more extensively scattered than the others, being found not only in the Baltic and North Atlantic, but in the Mediterranean also. It is

SOLE AND LUMP-SUCKER.



THE ORNAMENTED CHÆTODON AND ANGLER.

found also at the mouth of some of the rivers of Africa. The flesh of the sole, taken near the Cape of Good Hope, is said to surpass all others. The Ornamented Sole (*pleuronectes ornatus*) is a singular variety: it is brown, with dark spots. A specimen of this variety may be seen in the British Museum.

ORDER III.—MALACOPTERYGII SUBBRACHII, FISH WITH VENTRAL FINS UNDER THE PECTORALS.

FAMILY III.—DISCOBOLES.

THE SUCKERS.

This family is distinguished by the ventral fins being united at the base by a membrane, into a disk-like form. The Cornish Sucker (*lepadogaster cornubiensis*) has a tapering body of a reddish colour, with dusky spots; two purple marks are behind the eyes; the dorsal fin has eleven rays. It is about four inches long, and inhabits the British seas.

The Lump Sucker (*cyclopterus lumpus*) is a fish of disagreeable appearance and habits. Its skin is rough, with small tubercles; the back elevated, and of a dusky colour; the belly flat and red; it has three rows of large conical tubercles on each side. In length this fish is about a foot and-a-half. It is found in the northern seas. The lump sucker always remains at the bottom, adhering firmly to any object on which it may chance to fasten. Pennant says, that on throwing an individual of this species into a pail of water, it adhered so firmly to

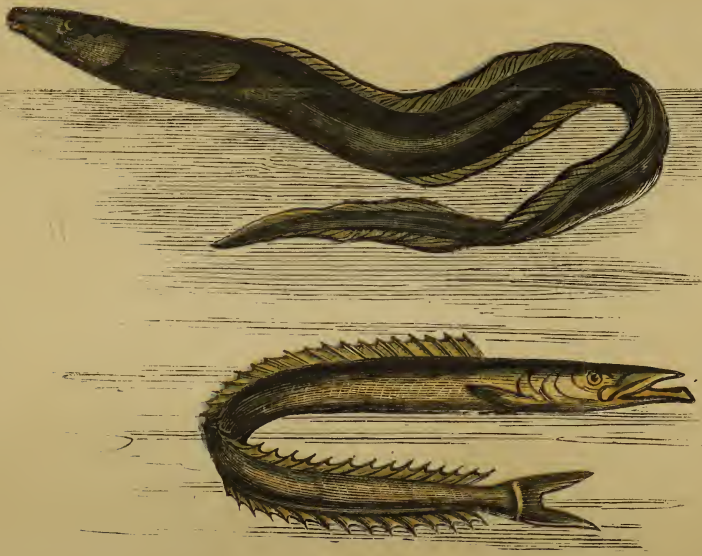
the bottom, that, on taking the fish by the tail, the whole pail was lifted up, though it held several gallons.

The Remora (*echeneis remora*) is another of this disgusting family, and the last which we can mention. The head bears on its top a flattened disk, composed of transverse plates, obliquely directed backward, spinous at the border, and moveable in such a manner that the fish is able, by producing a vacuum, to fix itself to different bodies, such as rocks, vessels, and other fish. This has given rise to the absurd notion, that the remora could stop a ship. It is of a brown colour, and about eighteen inches long. The smallness of the fins of this creature prevents it from swimming rapidly; compensation is made for this by the extraordinary faculty it possesses of attaching itself to other fish. Even sharks, those tyrants of the deep, have been taken with the remora fastened to their body; and so firmly, that considerable force has been required to remove it. The remora is principally found in the Mediterranean.

ORDER IV.—MALACOPTERYGII APODES. ANGUILLIFORMES, OR EEL-FORMED FISH.

THE EELS.

This family is known by its elongated form: the opercula or gills, are small, and very far back and sheltered, allowing these fish to remain for some



CONGER AND SAND EELS.

time out of water. The whole family have no ventral fins.

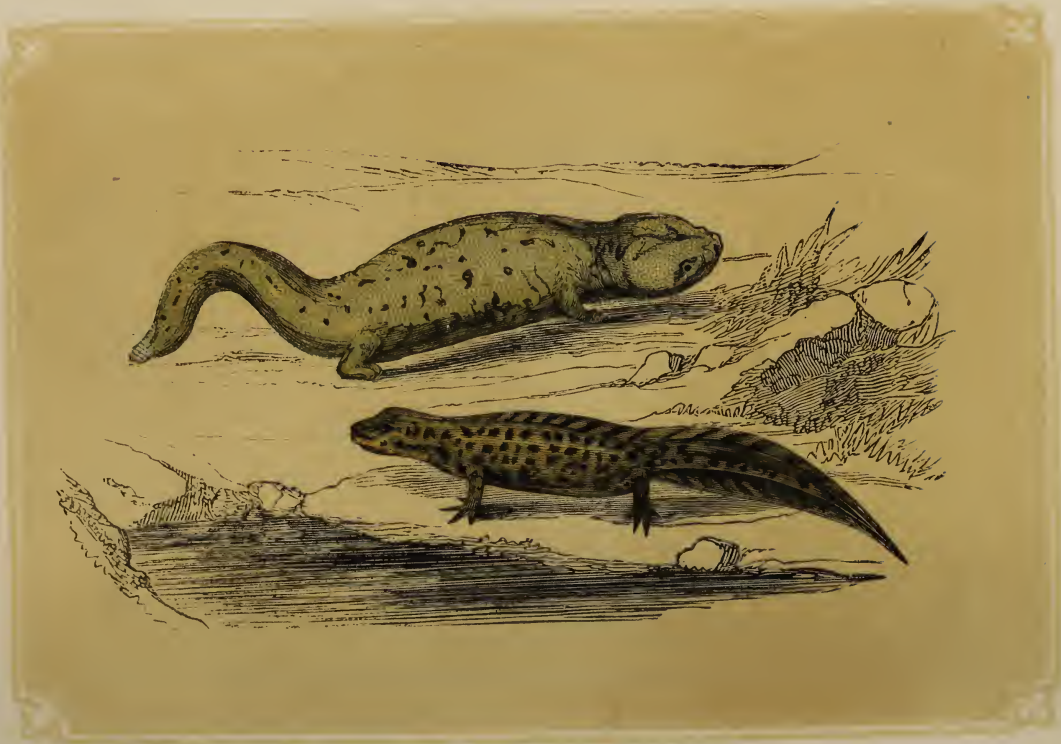
The Common Eel (*muræna anguilla*) is too well known to require description. The silver eels of the Thames are in considerable request; but they furnish a very inadequate supply for the London markets: the greater part of the eels which are consumed in England being imported from Holland. The eel is of slow growth, but continues for a long series of years. It is also, for the most part, viviparous.

The Conger, or Sea Eel (*muræna conger*) is common to all the seas of Europe, of Northern Asia, and America. Five or six feet, or even more, is no uncommon length, and of the thickness of a man's leg. The conger is most voracious, living chiefly on fish and crustacea. Its flesh is not considered very healthy for a weak stomach.

The Electrical Eel (*gymnotus electricus*) well deserves admiration, its organization being so singularly scientific. The length of this fish is from three to four feet, and thick in proportion. The tail, which is very strong, the animal whirls about with amazing agility. The colour above is a black brown; the under parts orange, with black spots. The smaller rivers of South America much abound with them; and they are much dreaded. Their history was, until lately, almost unknown; but several having, within the last few years, been brought to England, we are now much better acquainted with them than formerly.

The shocks produced by the *gymnoti* are accompanied with sparks, altogether similar to those

produced in electrical operations. These sparks may be obtained from the animal, as from the battery of an electrical machine, by forming a circuit. Shocks appear to be given at the pleasure of the fish, and those possessing most terrific power. M. de Humboldt, who received a shock from one of these creatures, says, that it was more painful than an electrical shock, the pain continuing in the knees for many hours afterwards. The apparatus within the body of the fish, which produces these marvellous results, is of a singular and complicated character, consisting of four bundles of muscles, which form nearly one third part of the entire fish. These four bundles are composed of a great number of tendinous expansions; long, parallel, horizontal, and separated from each other by about the twentieth of an inch. Other muscles, or expansions, cut the preceding almost at right angles, forming a wide and deep network composed of a multiplicity of small cells. The cells are filled with a gelatinous kind of substance. This well elaborated apparatus is put in play by a system of nerves emanating from the spinal marrow, composed of as many trunks as there are vertebræ, and receiving, besides, some branches of a large nerve, which runs in a straight line from the *cranium* to the extremity of the tail, above the backbone. All the ramifications of these various nerves are spread out in the cells of the electric organs; and thus become so many instruments for striking, with death or torpor, all animals within reach of their influence. This seems eminently to be the case, when the *gymnotus* is thoroughly worked up to a pitch of rage. After a few terrible shocks, however,



SALAMANDER AND WATER EFT.

the animal becomes exhausted; and its capability for renewed combat much weakened.

M. de Humboldt informs us, that he witnessed an extraordinary combat with the *gymnoti*, in a stagnant water called *Cano de Bera*, near the village of *Rastro de Abaxo*, in South America. A number of half wild horses were compelled to enter this water, urged on by the Indians, who were provided with long reeds and harpoons for the purpose, and to prevent the horses from attaining the opposite shore. The eels, confounded by the noise of the horses, defended themselves by reiterated discharges of their electric batteries. For a long time the *gymnoti* seemed to gain the advantage; the horses being seen in every direction, stunned by the frequency and force of the shocks, and disappearing under the water. Several of the horses, however, rose again; and some of them, in spite of the vigilance of the Indians, gained the shore, exhausted with fatigue, and their limbs benumbed by the shocks which they had received, stretched themselves at full length upon the ground. The contest, however, was fast coming to an end; for the horses still in the water, which at first appeared with bristling manes, and with terror and anguish depicted in their eyes, gradually became less affrighted, their manes no longer bristled up, and their eyes less expressive of suffering and fear; whereas the eels were now for retreating, in their turn, from the horses, instead of attacking them; and presently a number of the *gymnoti*, like huge aquatic serpents, were to be seen floating rather than swimming on the surface of the water, showing their yellow bellies,

from their retroverted position. The Indians could now draw many of these terrible combatants to the shore. It is true that in less than five minutes from the beginning of this spectacle, two of the horses had been drowned; but this might probably have been occasioned partly by their being stunned by the first discharges of this animal electricity, partly by the extreme terror into which they were thrown, and partly by the stronger horses having passed over their bodies. This marvellous exhibition, from its commencement, was quite at an end in less than a quarter of an hour.

The specimen of the *gymnotus*, which was shown a few years ago, at the Adelaide Gallery, appeared to be naturally quiet, allowing its attendant to stroke it, remaining still during the time, and even caressing the hand which thus noticed it. The *gymnoti* belong almost exclusively to the rivers of South America.

The Sand Eel (*ammodytes tobianus*) is the smallest of the eel family, rarely exceeding six inches in length. It is found in abundance, during the summer months, on most of our sandy shores, and those of other northern seas. It is dug or drawn out, by means of blunt hooks, at the recess of the tide. The back of this fish is bluish-green; the sides and belly silvery.

PILOT FISH AND SEA PORCUPINE.

THE TUFT-GILLED.

This family is generally of small size, and almost without flesh. It is distinguished from all other fishes by the character of its gills, which are disposed in tufted pairs.

The Smaller Pipe-Fish *(syngnathus typhle)*, besides having the branchial opening towards the neck, is further distinguished by its *ova*, or eggs, being hatched in a pouch, formed by an expansion of the skin, which is placed under the belly, or at the base of the tail, which opens to allow the young to get out. The body of the pipe-fish is marbled with yellow and black; the fins are grey; the beak slender and compressed on the sides; eighteen plates on the body, and thirty-six on the tail, form so many articulations; the tail is square; its length about a foot. It inhabits the northern seas.

The Sea-horse *(syngnathus hippocampus)*, is another variety in this family, being also an inhabitant of European seas. It derives its name from the head, in a dried state, bearing some resemblance to that of a horse. The body is of an heptagonal shape, having seven rows of tubercles; the belly projects with a notched edge; the tail is square, terminating in a finless point; the head is large, with a cartilaginous excrescence above the nose. The colour of this fish is grey on the back and sides, spotted with white and black; the belly is brown. It seldom attains to more than a foot in length.

ORDER VI.—PLECTAGNATHI, OR FIXED-JAWED.

FAMILY I.—GYMNODONTES.

THE TOOTH-JOINED.

This order is characterized by the manner in which their jaws are armed. The *gymnodontes*, instead of apparent teeth, have the jaws furnished with an ivory substance, which somewhat resembles the bill of a parrot, but which, in reality, constitutes true teeth united together.

The Globe, or Balloon-fish *(diodon atinga)*, has the power of inflating itself with air, which done, it turns upside down; the spines, with which the skin is furnished, being then raised on all sides, prove a means of defence. In this state the fish is dangerous to handle. There are several varieties, but all inhabiting tropical seas. The *diodon bursuarius* is an extraordinary variety.

ORDER VI.—PLECTAGNATHI, OR FIXED-JAWED.

FAMILY II.—SCLERODERMATA.

THE ROUGH-SKINNED.

The Sea-hog *(balistes capriscus)* is armed with distinct teeth, though but few in number, to each jaw; its skin is rough, and clothed with hard scales. These fish are found in great numbers in the torrid zone, near rocks, on a level with the water, where they shine with brilliant colours. Their flesh is re-

putedly poisonous: it may not be so, but their frightful shape would seem alone sufficient to deter any one from making the experiment.

SERIES II.—CHONDROPTERYGII, OR CARTILAGINOUS FISHES.

ORDER I.—ELEUTHEROBRANCHII, OR FREE-GILLED.

THE STURGEONS.

Cartilaginous fish are divided into those whose gills are free, like those of ordinary fishes; and those whose gills are fixed, that is, attached to the skin by their external edge, so that the water does not issue from their intervals, except through the holes of the surface. Sturgeons belong to the former class, and are, besides, essentially cartilaginous, although furnished with bony bucklers, implanted lengthwise on the skin. The head is likewise cuirassed in the same manner; the mouth is small, and without teeth.

The Common Sturgeon *(accipenser sturio)* is about six or seven feet in length. Its flesh much resembles veal. The sturgeon is found almost everywhere in the main ocean, and in narrow seas, also, at certain times of the year. It seldom visits the Thames, but is not unfrequently found in our more northern rivers, and in all the northern rivers of Europe, chiefly during the months of March, April, and May. Sturgeons often attain to a great size, feeding almost entirely on small fish. In the sea, or at the mouth of rivers, they may live on herrings and mackerel, though they much delight in disturbing the

muddy bottoms of rivers, in search of worms, and other reptiles. They ascend the rivers, like the salmon, for the purpose of depositing their spawn. The roe of the female is immensely large, often weighing nearly one-third of the entire fish. Of this *caviar* is made, which is consumed in large quantities in Turkey, Russia, Germany, and Italy.

SERIES II.—CHONDROPTERYGII, OR CARTILAGINOUS FISHES.

ORDER II.—PENTOBRANCHII, OR CONFINED GILLS.

FAMILY I.—PLAGIOSTOMI, OR RUDIMENTARY-JAWED.

THE SQUALI.

The fishes of which we are next to treat differ from all the preceding, since in this family the gills adhere to the external edge, so that they suffer the water to escape by as many holes pierced in the skin as there are intervals between them. This family is ovoviviparous, the eggs being hatched in the oviduct of the mother.

The Greater Catfish *(scyllium canicula)* has an elongated body, with a thick and fleshy tail; the pectorals are of middle size; the teeth have a point in the middle, and two smaller ones on the sides. These fish are found in almost all seas, and are extremely voracious. Fish form their ordinary food, but sometimes they will attack fishermen themselves, or those whom they may find bathing.

The White Shark *(squalus carcharias.)* This

monster of the deep is the most terrible of its kind, and found occasionally in the British seas. The head of this formidable animal is flat, with very small eyes. The mouth being deeply cleft, forms a wide gape, ten feet in circumference; the teeth are triangular, slightly jagged, and from two to three inches in length; their number seems to increase with the age of the animal. The nostrils are greatly developed, and the faculty of smell, on which the shark depends in its predatory movements, acute. Its capability in swallowing is surprising, so that the entire body of a man, or even of a horse, has been found in the stomach of this sea-monster. Many naval officers have remarked, that such is the boldness of this marauder, that, regardless of the noise and turmoil which attend a general naval engagement, the shark may be seen attacking the unhappy men who had fallen into the sea. Seals, cod, and other fish, form its ordinary food; but, like the vultures on land, it is attracted by the smell of putrescent animal matter of all sorts. During the revolting horrors of the slave trade, these voracious creatures have been known to follow a slave-ship from the African shore, the whole voyage across the Atlantic, to devour the bodies of such miserable blacks, whose sufferings during the passage had ended in death. Nay, more, those human bloodhounds who had the command of such ships, in the event of insubordination arising amongst the captive blacks, have given orders that certain individuals, selected from amongst them, should be thrown overboard, as examples to the rest; while the ship's company, in common with their brutal captain, have enjoyed the sight of witnessing the sharks seiz-

ing and devouring such unhappy human beings. So low has humanity fallen! A shark will spring from the water to a height of twenty feet, to seize a human body suspended for the purpose by a line.

The shark is ovoviviparous, the young at their birth being about seven or eight inches long. It is quite unknown how long sharks are in attaining their full size, which often amounts to twenty-five, or even thirty feet. The usual period of their life also continues a mystery.

Few fish are more singular or remarkable than the Hammer-headed Shark *(squalus zygæna.)* The head is flatted horizontally, and elongated on each side into a branch, resembling a double-headed hammer. The eyes are large, prominent, and lodged at the extremities of these branches of the head, which are also pierced by the nostrils. The opening of the mouth is semicircular; the teeth are large, sharp, and indented on each side, three rows being in each jaw. This variety inhabits most of the southern seas. Its colour is grey; the head nearly black; the eyes yellow. It frequents deep water; is very voracious and dangerous, even to man. Its average length is from twelve to fifteen feet. The *zygæna* of New Holland differs but little from that already described.

The Rays form another family of a revolting character, though remarkable and curious. The Torpedo (*torpedo narke*) claims our first notice. The disk of the body is almost circular, the anterior edge being formed by two productions of the muzzle, which stretch along the side to join the pectorals. The space between the pectorals and the head and

gills is filled, on each side, by an extraordinary apparatus, formed of small membraneous tubes, crowded against each other, like the combs of bees, subdivided by horizontal diaphragms into small cells, full of mucous matter, and abundantly supplied with nerves. In this apparatus, the electric, or galvanic power, resides, and which renders the torpedo so notorious. The animal is capable of giving very violent shocks to those who touch it; and depending as they do on the will of the animal, serves both for a means of defence, and for catching its prey. The body of this fish is smooth; the teeth small and sharp. The torpedo is far from common on our own coasts; but is abundant in the Mediterranean, the Persian Gulf, the Indian and Pacific Oceans, and about the Cape. It feeds on small fish; and varies in length, from two to four feet.

The THORNBACK (*raia clavata*), and SKATE (*raia batis*) belong to this family. The skin of the thornback is shagreened, freckled above, and white underneath. A row of strong spines passes down the back, with three rows on the tail. When young, they are called *maids*, and are then spotted with white. The general size is about three feet; but their skeletons being completely cartilaginous, their size is perhaps unlimited. They are found in all European seas, but especially in the North Sea. Thornbacks are ovoviviparous, very voracious, and feed on small fish. The SKATE is almost identical with the thornback. It is often of very large size, some having been taken off our own coast which weighed two hundred pounds; but in the West Indies, the skate are even larger, many of them having been taken which

measured twenty-five feet in length, by thirteen in breadth.

The STINGING RAY (*raia pastinaca*) is another variety. It is pear-shaped, with the muzzle slightly pointed; of a dirty-yellow colour above, white underneath, and seldom exceeds from twelve to fifteen pounds in weight. The sting, with which these fishes are armed, inflicts a very dangerous wound. This weapon is serrated, and with it the animal can inflict a fearful wound, and with the swiftness of an arrow. It was formerly believed to be poisonous; this, however, is not the case, though the inflammation arising from the wound often assumes a very dangerous character.

SERIES II.—CHONDROPTERYGII, OR CARTILAGINOUS FISHES.

ORDER II.—PENTROBRANCHII, OR CONFINED-GILLS.

FAMILY II.—CYCLOSTOMA, OR CIRCULAR-MOUTHED.

THE LAMPREYS.

THE family now to be described, is the least perfect of fishes; having neither pectoral nor ventral fins. They approach very nearly to worms. The SEA-LAMPREY (*petromyzon marinus*) is always found in the sea, excepting in the breeding season, when it ascends the rivers. It attaches itself, by means of its sucker-mouth, with great force, to rocks and stones, an organization kindly given to this creature, to prevent its being tossed about by the waves, a swimming-bladder being denied to it. At first sight,

from their elongated body and rounded shape, they may well be taken for eels. These fish are very lively, and exude a considerable viscosity from all parts of their bodies. They feed on animal matter, either living or dead. Like the generality of fish, they are oviparous. They are of a brown greenish colour on the back; the belly silvery-white. Their usual length is about a yard, although they often attain to a much larger size. They are found in most seas, but more in the north than the south. The lamprey, in some parts, is still much esteemed as an article of food: it seems, however, much better suited for the dunghill than the table.

The River Lamprey (*petromyzon fluvialis*) greatly resembles that of the Sea, though much smaller, seldom exceeding eighteen inches in length. The head has a greenish tinge; the back blackish; the sides approaching to yellow; and the belly silvery. It passes the greater part of the year at the bottom of the deepest rivers, lakes, and ponds. In the spring, it proceeds, if practicable, to ascend the stream, for depositing its spawn. At this season it is found in our markets, and sold under the extraordinary name of *nine-eyes;* although the branchial openings, called eyes, are but seven on each side. Lampreys are disgusting objects to the sight; and ill-fitted for the human stomach.

OF REPTILES IN GENERAL.

Having gone so much at length in the former part of our work, we can now only give a very brief sketch of what remains.

Reptiles consist of oviparous quadrupeds, and serpents; feet being assigned to the former, while the latter are without them. Some of this class live in the water, others on land; some possess the capability in different degrees, of living both on land and in water. External heat seems essential to them, or they fall into a state of torpor; their internals are such that they seem almost insensible of pain, discovering but little suffering, even when cut to pieces. The sight of these creatures, in general, is good; but their hearing, smell, taste, and touch, are extremely obtuse. The half existence of reptiles, however, does in a great measure account for their extreme longevity. The crocodile continues to grow during its entire life, and hence is ever young. The same is true of serpents, which, among the Egyptians and Greeks, were even regarded as emblems of eternity.

There is one singular property in reptile races which must not be overlooked;—the power of reproducing certain parts of the body, as the tail, or feet, when by accident they chance to lose them: this has long been known to be the fact, especially in salamanders and lizards. Reptiles are likewise remarkable for their extreme tenacity of life, and for the long duration of fibrous irritability after death. The dismembered limbs of frogs under

galvanic excitement, sufficiently demonstrates this; while the fangs of poisonous serpents have been known to do their murderous office long after the death of the animal. The nutritive system in reptiles is always feeble, hence they can endure excessive abstinence without apparent injury.

In European climates, the majority of reptiles breed in shady and humid land; but the larger number of reptiles are found in the morasses, lakes, and rivers of tropical climates. In countries subject to periodical inundations from rivers, the land and water seem to contend for the mastery of monstrous births. Reptiles are all provided with arms, aggressive or defensive. To the tortoise is given its carapace and plastron; lizards possess extreme agility and fear, as a means of escape, and a sure retreat from the storm in some hole or cavern; to the crocodile is imparted a complete suit of armour, with teeth of surpassing power; to the gigantic boa strength is imparted, exceeding that of Sampson, and a power of deglutition unparalleled; to many of the serpent tribe, terrible venom fangs are given as a means of defence.

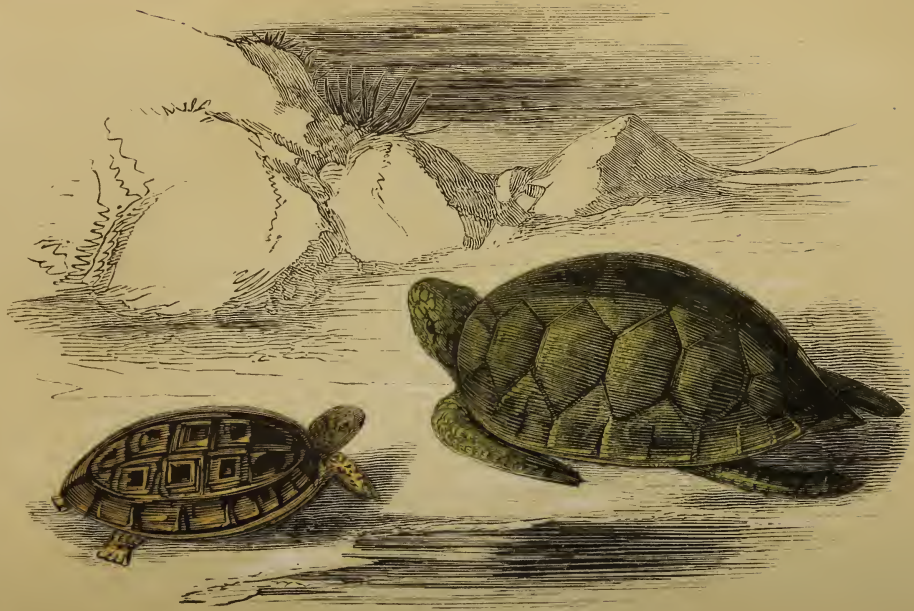
Great variety exists in the teeth of reptiles. The teeth of lizards are of the canine kind; those of the crocodile are very numerous and long, extending through the entire jaw; serpents have sharp teeth in both jaws; and some, like fishes, have them in the palatine arches also. In addition, the venomous serpents have very sharp and long teeth in the upper jaw, which are hollowed like a funnel, through which, from glands beneath the teeth, a yellowish poison is secreted. The virulence of this poison,

however, greatly depends upon the state of the animal, and the season of the year. In all cases it is highly dangerous. Tortoises, generally speaking, are without teeth.

Reptiles, with few exceptions, live on animal food; but their digestive powers are extremely feeble. Some of them also are oviparous, others ovoviviparous, or viviparous, and others, as the frog and toad, deposit spawn in the water, like fishes. The fecundity of almost all is surprising; and but for the immense destruction to which the young are exposed, would soon become alarming. The forest of Fontainebleau, only a few years ago, so swarmed with vipers, that the government were obliged to adopt means for their extirpation. The feelings of maternity among this class of animals, are apparent but in few cases.

The voice of reptiles is but seldom heard, excepting during the season of love. Then, crocodiles howl loudly; serpents express their feelings by hissings; and frogs are also in full tune. A traveller on the desert shores of the Volga, heard, in the evening, a noise at a distance, like a joyous assembly of men and women laughing very heartily; on a nearer approach, he found, to his astonishment, that the noise proceeded from an assembly of *black toads*, which were celebrating their nuptial orgies.

Reptiles are divided into four great families. The chelonians, or tortoises; the saurians, or lizards; the ophidians, or serpents · and the batrachians, or frogs.



TORTOISES.

In Hebrew, *Tzav.*—In English, *The Protuberant.*

"*These also shall be unclean unto you, among the creeping things that creep upon the earth; the weasel, and the mouse, and the* TORTOISE *after his kind.*"—Leviticus, xi., 29.

Tortoises are distinguished externally by a double shield, in which all their body is enclosed, excepting the head, neck, tail, and feet. The upper shield, or carapace, is formed from eight pair of ribs, which become widened and united together; the breastplate or plastron usually consists of nine pieces, which ramify in like manner as the upper shield; the vertebræ, or bones of the neck and tail, being alone moveable. The animal breathes through the mouth. Tortoises have no teeth, the jaws being covered with a kind of horn: they can, notwithstanding, bite severely. They are viviparous, depositing their eggs in the sand for the sun to invigorate them.

The Common Tortoise (*testudo græca*) has a hemispherical shell, marbled with black and yellow; the feet are short, and covered with ovate scales; the tail, which is short, terminates in a horny tip. It is found in all the countries of Southern Europe. Towards the end of autumn it digs its winter retreat in the ground, not reappearing until about the middle of April: during this retreat the animal takes no food. It is remarkable for its longevity, and tenacity of life. It is a well ascertained fact

that about the year 1633, a tortoise of this kind was brought to the archiepiscopal palace of Lambeth, then occupied by the notorious archbishop Laud. This animal survived until the year 1753, when it was supposed to have perished, rather from accidental neglect, than old age. Cabbages, lettuces, and other such plants, constitute its favourite food.

Sea tortoises, or *turtles,* have their feet flattened into scaly fins; their toes are unequal, being elongated, scaly, and united by a membrane with very small nails upon their exterior border, terminated by scaly laminæ. Of these the GREEN TURTLE (*chelonia mydas*) is the most common. This tortoise exceeds all others in size and weight, being six or seven feet long, and weighs seven or eight hundred pounds. The green turtle is commonly found on the low, arid, sandy shores of both continents, principally however under the torrid zone. At certain periods these animals are observed to quit the bottom of the sea, and repair, in crowds, towards the mouth of great rivers. They are very timid, never seeking to defend themselves. About the month of April the females deposit their eggs in a dry place on the shore, excavating the sand with their fins: they will sometimes deposit a hundred eggs during a single night. In this manner, with an interval of fourteen days, or three weeks, they will lay three successive sets of eggs. Twenty-one days elapse before the young appear. Large numbers of turtles are every season sent to this country, chiefly from Jamaica.

CROCODILES.

In Hebrew, *Liyathan.* — In English, *The Well-Compacted.*

"*Canst thou draw out* LEVIATHAN *with a hook? or his tongue with a cord which thou lettest down? Canst thou put a hook into his nose? or bore his jaw through with a thorn? Will he make many supplications unto thee? will he speak soft words unto thee? Wilt he make a covenant with thee? wilt thou take him for a servant for ever? Wilt thou play with him as with a bird? or wilt thou bind him for thy maidens? Shall thy companions make a banquet of him? shall they part him among the merchants? Canst thou fill his skin with barbed irons? or his head with fish spears? Lay thine hand upon him, remember the battle, do no more.*" —Job, xli., 1—8 inclusive.

This beautiful and poetical description must refer to that monstrous reptile—the Crocodile of the Nile (*lacerta crocodilus*). This terrific reptile is often found from twenty to thirty feet in length, with an elongated and flattened head, which is rounded at the extremity. The number of teeth in the upper jaw is usually thirty-six, and in the lower thirty, which are strong, conical, striated, and of unequal length. It surpasses, says Lacépède, both the eagle and the lion in size, and with few exceptions, has no equal in nature. The skin is covered with small bucklers which are proof against the sword and the musket-ball: this renders the animal almost invulnerable. The calls of hunger make crocodiles extremely voracious: they can however remain a long time without eating. Unless near the equator, these animals bury themselves in the mud during the entire winter. Their longevity is

believed to be great. Though heavy on land, they swim with great facility. The females lay two or three times in a year at short intervals, about twenty in number, which they bury in the sand: the eggs in size are about twice as large as the egg of a goose, and of a whitish colour. The young, when born, betake themselves to the water. At the end of a year the young are still both small and feeble. This Egyptian monster is now seldom found within the delta of the Nile, having retired to a greater distance.

The ALLIGATOR (*lacerta alligator*) has a broad muzzle, and teeth of unequal length. The colour nearly resembles the foregoing species, being of a blackish-green colour. It abounds in the lakes and rivers of Carolina and Florida, no less than in those of Guiana and Brazil. In general alligators are of less size than the true crocodiles; but they vary in different localities: their ferocity is also less.

LIZARDS.

IN HEBREW, *Lotaah.*—IN ENGLISH, *Creeper.*

"*And the ferret, and the* CHAMELEON, *and the* LIZARD, *and the snail, and the* MOLE, *these are unclean to you.*"—LEVITICUS, xi., 30, 31.

LIZARDS form a very numerous family. They inhabit various parts of the world, equally delighting in hot and temperate climates. Although disagreeable in form, they are in general very agile, and often of brilliant colours. None of them are venomous,

but will bite with great violence when attacked. They never go into the water, are found only in pairs, and in temperate climates pass the winter in a lethargic state. They are also extremely timid. They feed on insects, frogs, mice, and other small animals. The larger lizards will even attack serpents, though in this kind of combat they are seldom victorious. Lizards are frequently eaten by uncivilized tribes.

The Green Lizard (*lacerta viridis*) ranks among the larger of its species, frequenting woods in low situations, but exposed to the sun.

The Geckos form another branch of the lizard family, and are both disgusting in appearance, and poisonous also. From the lobules of the toes a poison exudes which adheres to provisions over which they may chance to run. Hasselquist relates, that at Cairo he saw two women and a girl who were at the point of death, in consequence of having eaten some cheese, over which these reptiles had crawled. Their bite is also poisonous.

The House-Gecko (*lacerta gecko*) is common in countries bordering the Mediterranean Sea, and in southern Europe. It creeps into the house, and has such tenacity in its webbed feet, that it can run with facility upon glass. It feeds upon insects.

The Chameleon (*chameleon vulgaris*) has long been celebrated for its supposed faculty of living upon air, and for changing its colour. Its name in the Hebrew scriptures, according to Bochart, is *Teshameth, or the breather,* though in the Bible translated the Mole. Pliny, the naturalist, asserts that the chameleon is the only animal which neither

eats or drinks, the air serving it for food. It does partially change its naturally green colour to yellow or grey, but this depends on the will of the animal, and on the state of its health. It walks very slowly, sometimes remaining on the same branch for entire days. Flies are its principal food. Chameleons are only found in the warmest parts of Asia and Africa, and are caressed by the natives, being very gentle and unoffending.

The IGUANAS form another branch of the lizard family, and are often found of large size. Though disgusting in appearance, they are singularly quiet and harmless. They abound in the West Indies.

NON-VENOMOUS SERPENTS.

WE now come to an extensive and most revolting class of reptiles, the serpent tribe; against which a war of extermination is ever waging, whether they be harmless or dangerous. Where the population is large, these marauders are rare; but in the forests and morasses of tropical countries they are frightfully numerous, often grow to large size, and become dangerous to man from their strength, if not from their poison.

The whole class of serpents range very low in the scale of animals, their senses generally being feebly developed; and unless excited by the rays of a tropical sun, or the cravings of hunger, are sluggish and timid. In temperate climates snakes usually pass the winter in a state of torpidity.

These reptiles almost invariably feed on living flesh; they never drink, digest slowly, and eat seldom. A single meal will often suffice for many weeks; yet when the opportunity occurs, they will eat an enormous mass of food at a time. Many serpents, from the peculiar dilatable structure of the jaws and throat, will swallow animals even larger than themselves. All the ophidians or snakes are furnished with teeth, which are rather prehensile than masticatory, the food being always swallowed whole. The poisonous kinds have glands at the root of the teeth which generate poison, and which the animal has the power of ejecting into the wounds which it inflicts. This is sometimes of so virulent a nature, that a person bitten will survive, after the bite, only a few minutes. Of the serpent tribe, however, only about eighty out of two hundred and thirty-three possess this dangerous means of defence. The greater number of this family is oviparous; some are viviparous.

The Common Snake (*Natrix torquata*) of our own country, is a pretty harmless creature, and easily tamed. It is found in damp meadows and hedgerows, especially in the neighbourhood of water. Snakes are often to be found in gardens, attracted thither by the warmth of hot-beds, or heaps of manure; where also their eggs are deposited. This snake readily takes the water, swimming well. It also pursues its prey with great determination, as mice and small birds, but especially frogs. The colour of the common snake is a yellowish-green; but in foreign countries varieties of this species are found of various colours.

Amongst the non-venomous serpents the Boas claim special notice, from their immense size and strength: being thirty or forty feet long, or even more. They derive their name from a false tradition, that they fasten upon the teats of cows, and suck their milk. The *boa-constrictor* owes its tortuous actions, and enormous muscular power, to a peculiar organization. The vertebræ, or back-bones, and the ribs, constitute the entire skeleton. These being acted upon by five sets of muscles, give to this gigantic reptile an amazing power of constriction, enabling it to strangle and break the bones of large animals, or even of man himself. When the prey is dead, the snake unfolds itself, covers its prey with a mucous saliva, and then swallows it whole, beginning with the head. These formidable reptiles are chiefly found in Africa and South America. Serpents of large size are also found in India; but these, differing a little from the *boas* in their anatomy, have been called *pythons*. Specimens of each kind may be seen in the Gardens of the Regent's Park.

A negro herdsman, in the employ of governor Abson, Western Africa, was one day seized by one of these monsters by the thigh. The serpent, happily for the poor fellow, in attempting to throw itself around the man, got entangled with a tree; and the negro being thus preserved from the compression of the snake, had presence of mind enough to cut the serpent with a large knife which he had with him until he killed it; thus disengaging himself from his frightful situation. He became however permanently lame, from the bites which the serpent had inflicted.

The Black Snake (*coluber constrictor*) is very common in North America; its bite is not dangerous, though the creature is very strong, defending itself obstinately when attacked. It is also an expert climber, and is in consequence much feared by the smaller birds while rearing their young. When this marauder is attacked by the parent birds, notwithstanding its courage, it is compelled to make a retreat. The black snake in America holds the place of the common snake of Europe.

POISONOUS SERPENTS.

In Hebrew, *Tziphone.*—In English, *The Hisser.*

"*They hatch* cockatrice' *eggs, and weave the spider's web: he that eateth of their eggs dieth, and that which is crushed breaketh out into a viper.*"—Isaiah, lix., 5.

It is believed that the word *cockatrice* means the viper, which is a dangerous reptile everywhere, but especially in hot and sandy countries. "There is a viper," says Dr. Shaw, "called *leffah*, or *effah*, which, though not of large size, is extremely malignant, its bite occasioning death, without timely remedies are applied, in a very few minutes. It is common on the southern side of the Atlas Mountain, and, from its brazen colour, may probably be the fiery serpent mentioned by Moses in the twenty-first chapter of the Book of Numbers." The viper, though viviparous, produces her young from eggs formed in the belly of the mother; but if the egg by any means is crushed,

the young viper becomes disengaged, and leaps out, prepared for mischief. This curious natural fact reconciles the statement of the prophet with the truth of natural history.

The COMMON VIPER (*coluber berus*), is the only poisonous reptile which we have in England. Its length rarely exceeds two feet, its colour sombre, its motions slow, and its shape inelegant. The food of the viper consists of small animals, young birds, and insects. It is torpid during the winter; in the warmer months its bite is serious, and sometimes fatal. The viper is found throughout Europe, and is everywhere to be dreaded.

The HAJE of Egypt is believed to be the true *aspic*, or *asp*, of antiquity. Its history is connected with the renowned Cleopatra, the beautiful queen of Egypt, and mistress of Anthony. On the decline of her fortune, she applied one of these reptiles to her breast, and died in consequence of the wound which it inflicted. This dangerous serpent is often referred to in the Holy Scriptures by the name of *adder*, or *asp*. When provoked, the *hajé* swells, and extends its neck greatly; it then springs with a single bound upon its enemy. It has the habit of rearing up when approached, and expanding the skin of its neck, which is very dilatable, into a kind of hood. The Egyptians regarded this horrid reptile as the guardian divinity of their country, and hence it was sculptured on the portico of all their temples. In common with other poisonous snakes, it is furnished with glands at the root of the teeth, which secrete poison; this the creature can inject into the wounds it inflicts, often proving fatal in the course of a few minutes.

The Cobra di Capella, or *spectacled snake*, so called from a mark on the skin of the neck resembling a pair of spectacles, is common in India, and belongs to the same family, being no less fierce and dangerous. Yet these reptiles are tamed by the Indian jugglers, and taught a number of little tricks. This extraordinary exhibition was lately to be seen in the Zoological Gardens, Regent's-park, and attracted great attention.

The Rattle-Snake (*crotolus horridus*) of North America, is the last of the poisonous ophidians which we can notice. These terrible serpents have been known from the earliest period of the discovery of America, by the danger of their bite, and the peculiar appendages of their tail, which caused them to be called *rattle-snakes*. The tail of this snake is short and somewhat thick, the rattles forming the extremity. These rattles consist of a number of light hollow bones, received within each other, the animal having, by a peculiar mechanism, the power of shaking them, when it fears an attack. The number of bones vary from one to thirty, or even more; and it is believed that one is added yearly, when the skin is thrown. These reptiles were formerly both numerous and of large size, some having been found ten feet in length, and eight inches in diameter; but they are fast fading away before an increasing population. Most animals, horses and dogs especially, dread the rattle-snake: smaller animals seldom attempt to escape when surprised by it, but become petrified with terror. Hogs however, will attack and feed upon them, which is also the case with some of the larger birds.

The poison of these serpents is so dangerous, that the slightest bite will kill almost the largest animal in a few minutes, the wound becoming gangrenous, and the victim dying in frightful agony. Yet the traveller, M. Bosc, was so little afraid of them, that he took all those alive which he met with. Rattlesnakes are confined to America; but in India, poisonous snakes of various kinds are very common.

The HYDRI, or *water serpents*, are far from uncommon, some of them being poisonous. They are distinguished by their flat tails, and are chiefly found in the Indian seas and rivers.

FROGS.

IN HEBREW, *Tzephardaia*.—IN ENGLISH, *The Mud-dweller*.

"*Their land brought forth* FROGS *in abundance*."—PSALM cv., 30.

THE fourth class of reptiles includes frogs, toads, and salamanders.

The COMMON FROG (*rana temporaria*) is so well known that it is unnecessary to describe it. It must be ranked with the cleanest and most harmless of creatures, changing its skin about every eighth day. It passes the winter in a torpid state, though, early in the spring, the croaking of the male frog is heard, being the note of love. The female, on shedding her spawn, has it impregnated by the male; and which, after an interval of about

FROG AND TOAD.

forty days, shows signs of life. She will produce from six to eleven hundred eggs at a time. The tadpole, on leaving the egg, first feeds upon the mucus with which it is surrounded, and afterwards upon pond-weed. When about ninety days old, the tadpole begins to change its form, and after a few days more, the entire frog is developed. This is one of the most extraordinary transformations in nature. With a change of figure, the appetite of this reptile changes also, so that the animal which in its tadpole state was strictly a vegetarian, then becomes carnivorous. To supply itself with suitable food, the frog is obliged to quit the water and seek upon land for worms and insects, which it always eats alive. Frogs are extremely tenacious of life, and will live without food for a considerable time. The full term of their life is believed to be about twelve years. There are several species of the frog, though in habits they are all essentially the same. In some places they are distinguished by the name of *Dutch nightingales, or fen organs,* from the noise which they make.

The Toad (*bufo vulgaris*) has for ages possessed a bad character, though supposed to be harmless, unoffending, and free from poison, as the frog. Some recent experiments, however, demonstrate that the toad and the salamander are not quite so harmless as was believed. They exude a liquid from their bodies, which renders the skin highly poisonous; so much so, that a small animal inoculated with the poison, died in the course of a few minutes. Although the toad resembles the frog in most respects, yet there is reason to believe that they never associate together.

Mr. Arscott gives some curious particulars respecting a toad. "Concerning the toad," says this gentleman, "that lived so many years with us, and was so great a favourite, the greatest curiosity was its becoming so remarkably tame. I knew it myself above thirty years; and by constantly feeding it, brought it to be so tame, that it always came to the candle and looked up, as if expecting to be taken up and brought upon the table, where I always fed it with insects of all sorts. It was fondest of flesh maggots, which I kept in bran; it would follow them, and when within a proper distance, would fix its eyes, and remain motionless for nearly a quarter of a minute, as if preparing for the stroke, which was an instantaneous throwing of its tongue at a great distance upon the insect, which stuck to the tip by a glutinous matter." Spiders and millepedes were also its favourite food. This singular inmate, at length, from an injury it sustained from a tame raven, died. There are many species of the toad, but what is said of one kind, almost equally belongs to another.

The Common Salamander (*lacerta salamandra*), Pliny, that prince of naturalists, gravely tells us, is very poisonous, indestructible by fire, and of neither sex, a progeny being formed by some unintelligible mode of production. All this our modern naturalists have disproved, showing that the terrestrial salamander, though disgusting in form, is, notwithstanding, one of the most harmless of reptiles. It is spread nearly all over Southern Europe, living in humid places, caverns, and ruined buildings. The salamander seldom quits its hole, being dull, destitute of courage,

GRASSHOPPER AND LOCUST

slow, and heavy. Its food consists of worms and flies. Other animals seem to have an instinctive horror of it, although its bite is perfectly harmless. The salamander utters no cry, never by any chance goes into the water, and, like the viper, is ovoviparous. The Water Salamander, or COMMON EFT (*siren lacertina*), agrees, in its principal anatomical conformation, with the species just described, differing chiefly by its flat tail, which adapts it for living habitually in the water; it, however, sometimes quits the water in the evening, when the weather is hot or stormy. This reptile deserves special notice, from the astonishing faculty of reproducing parts which have been removed by accidents, and those, too, with all their peculiar bones, muscles, and arteries.

All the animals hitherto described are vertebrate, or have a skeleton, more or less complete, and form the first great DIVISION of NATURAL HISTORY.

DIVISION II.

INVERTEBRATE ANIMALS.

THE classes now to be briefly noticed are all without any skeleton, or external frame-work, and form the second great DIVISION of our subject. They are divided into three sections—first, the *Mollusca*; second, the *Articulated*; third, the *Radiated*.

SECTION I.—THE MOLLUSCA.

CONCHOLOGY, or a knowledge of shells, has long been a favourite study, while an acquaintance

with the animals which inhabit those shells was for a long period overlooked. Baron Cuvier, and other modern naturalists, have formed these animals into a system, calling them *mollusca*, or *soft*, because the majority of the animals bearing this appellation are remarkable for the softness of their flesh. Naked or shell-less animals being soft, are also included in this class. The common snail may be taken as a type of the one class, while the common slug may represent that of the other. Nearly all the *mollusca* have a development of the skin, bearing some resemblance to a *mantle*. This, in the naked mollusca, is simply membraneous or fleshy, but when the mantle becomes so much developed, that the contracted animal finds shelter beneath it, the term *testaceous*, or shelly, is applied to it.

The variety in the form, colour, and brilliancy of shells, is almost infinite. The animals also inhabiting them are no less diversified. The stomachs of these creatures are sometimes simple, sometimes multiple, and their intestines variously prolonged. Some, again, possess the faculty of self-impregnation; others, although hermaphrodites, require reciprocal intercourse. Many have the sexes separated. Again, the body of some resembles a sac, open in front, whence issues the head, crowned with long fleshy arms, by means of which they crawl, and seize their prey. Of this class the *cuttle-fish*, or *nautilus*, may serve as an example. Others, as their principal organs of locomotion, have two membraneous fins situated in the sides of the neck. Of this family the *clio borealis*, a kind of sea-snail, may be reckoned as the type. A third class crawl by means of a fleshy disc on their

SHELLS AND CORALS.

belly, and are either naked, like the slug, or testaceous, like the snail: the shell of all the latter, however, is not large enough to take in the entire body of the animal. Others, again, have their mouth hidden in the bottom of the mantle, which also encloses the arms and bowels, and is open, either at one, or both of its extremities. This class have no apparent head: the common oyster will serve for an example. In another class of the *mollusca*, which have bivalve shells, the mantle has two lobes, and is always open; the animal also has fleshy arms, with numerous filaments, which can be withdrawn at pleasure into the shell. The common English *anomia*, a kind of mussel or cockle, may represent this class. The *lepas*, or *duck barnacle*, a multivalve shell, will serve as a type of the sixth and last variety of the *mollusca*. This animal, though very similar to the others, yet differs from them in having numerous horny and articulated limbs, together with a nervous system.

Our limits forbid our entering farther into this subject, but it may be useful to give a general idea of the SHELLS which the *mollusca* inhabit, and which, when cleaned and polished, form beautiful objects for the cabinet or the mantle-piece.

LIST OF SHELLS.

I.—MULTIVALVES, OR SHELLS WITH MANY VALVES.

1. Chiton.—Coat of mail: twenty-eight species.
2. Lepas.—Acorn-shell: thirty-two species.
3. Pholas.—Stone piercer: twelve species.

II.—BIVALVES, OR SHELLS WITH TWO VALVES.

4. Mya.—Truncate, trough-shell, or gaper: twenty-six species.
5. Solen.—Razor-sheath, or knife-handle: twenty-three species.

6. Tellina.—Tellen : ninety-four species.
7. Cardium.—Cockle, or heart-shell : fifty-two species.
8. Mactra.—Kneading-trough : twenty-seven species.
9. Donax.—Wedge-shell : nineteen species.
10. Venus.—Venus : one hundred and fifty-three species.
11. Spondylus.—Thorny oyster, or artichoke-head : four species.
12. Chama.—Clamps, or clams : twenty-five species.
13. Arca.—Ark : forty-three species.
14. Ostrea.—Oyster and scallop : thirty-six species.
15. Anomia.—Anomia, or antique lamp : fifty-one species.
16. Mytilus.—Mussel : sixty-four species.
17. Pinna.—Fin-shell, or sea wing : eighteen species.

III.—Univalve, single Valve with regular Spire.

18. Argonauta.—Paper sailor : five species.
19. Nautilus.—Pearly sailor : thirty-one species.
20. Conus.—Cone : eighty-three species.
21. Cypræa.—Cowry, or gowrie : one hundred and twenty species.
22. Bulla.—Dipper, or bubble : fifty-two species.
23. Voluta.—Volute, or wreath : one hundred and forty-four species.
24. Buccinum.—Whelk : two hundred species.
25. Strombus.—Winged, or claw-shell : fifty-three species.
26. Murex.—Rock, or trumpet-shell : one hundred and eighty-two species.
27. Trochus.—Top-shell : thirty-three species.
28. Turbo.—Wreath, gig, or top-shell : one hundred and fifty-one species.
29. Helix.—Snail or spiral : two hundred and sixty-seven species.
30. Nerita.—Nerit, or hoof-shell : seventy-six species.
31. Haliotis.—Sea-ear, or ear-shell : nineteen species.

IV.—Univalves, without a regular Spire.

32. Patella.—Limpet, or dish-shell : two hundred and forty species.
33. Dentalium.—Tooth, or tusk-shell : twenty-two species.
34. Serpula.—Worm shell : forty-eight species.
35. Teredo.—Ship worm : three species.
36. Sabella,—Sabella : twenty-five species.

CATTERPILLARS AND BUTTERFLIES.
1. SWALLOW-TAILED. 2. TORTOISE-SHELL. 3. WHITE ADMIRABLE.

It is remarkable that *shells* are nowhere noticed in Scripture. The word CORAL occurs twice. "*No mention,*" says Job, chap. xxviii. 18, "*shall be made* of CORAL, *or pearls, for the price of wisdom is above rubies.*" Pliny observes, "that the *coral* was highly esteemed anciently." The Indians value *coral* as highly as we value pearls.

SECTION II.—ARTICULATED ANIMALS.

WE proceed to notice the second section of invertebrate animals, in which the body of the animal, and in general the limbs also, are surrounded by articulated rings, affording a support for the soft parts, and an attachment for the muscles. They range higher in the scale of beings than the *mollusca,* though, like them, they possess no frame-work or skeleton. They are divided into four classes; (1,) the ANNELIDES, or *worms with red blood*; (2,) the CRUSTACEA, or *shell fish*; (3,) the ARACHNIDES, or *spiders*; and (4,) INSECTS.

CLASS 1.—The body of ANNELIDES, or worms with red blood, is soft, elongated, articulated, or divided into segments or transverse folds. Some of them form tubes to live in, either of calcareous matter exuded from their own body, or from foreign substances; to which tubes, however, they are not attached. These are the tenants of the four last species of shells, already referred to in our list of shells. None of this family have feet; but the greater number have *setæ,* or bundles of stiff and

moveable hairs, which supply their place. They are generally hermaphrodite, though some of them have need of a reciprocal intercourse. Their food consists partly of insects, and partly of vegetables. Almost all of them live in the water; many bury themselves in holes in the mud or sand. The sea *lumbrici*, or worms, though forming a numerous and diversified family, yet require no particular notice. The *lumbrici terrestres*, or common earth-worms, so well known, are the only animals of this class which do not enter the water. They are destitute of eyes, attain to about a foot in length, and their body is divided by about a hundred and twenty rings. They pierce the earth in all directions, and with considerable ease. At least twenty distinct species are known. Leeches form a numerous family amongst the annelides.

The Common Leech (*hirudo medicinalis*,) so useful in local bleedings, is well known to most persons. This reptile is furnished with a three-fold, or triangular jaw, with two ranges of very fine teeth, which acts like a cupping glass. The leech is usually of a blackish colour, striped with yellow. It seems extraordinary that the blood with which the leech will gorge itself, does not go into the stomach, but into distinct vessels: hence a single meal will suffice for more than a year, since part of the blood taken may be found still in a liquid state within the animal.

SILKWORMS

Class II.—CRUSTACEA, OR SHELL-FISH.

Under the general head of Crustacea all animals are included, which are covered with a crustaceous or shelly substance. Most of them feed on putrescent animal matter, and in all, the sexes are distinct. This class of animals is farther distinguished by having articulated feet, at the least six, in number. Their eyes are of two sorts: simple eyes, usually three in number, in the form of a small lens; or composite eyes, which are curiously divided into a number of lenses. In some *genera* the eyes are of both kinds. Other organs are found in the *crustacea*, and insects which are peculiar to them, namely, the *antennæ*, or feelers, which are affixed to the head, and are infinitely diversified in form.

The *Crab* family, first to be noticed, is one of considerable extent, and scattered almost throughout the world. Crabs are so well known, as scarcely to require description. They are all oviparous, are slow in growth, but live a long time. Some of them attain a very large size. They remain habitually in the water, but do not perish directly on being exposed to the air. Some species pass the largest portion of their life on land, only visiting the water during the season of love. They possess in an eminent degree the extraordinary faculty of regenerating their limbs when lost by accident—a process which is done with great rapidity.

The Common Crab (*cancer pagurus*) has nine folds in its shell, on each side, with three holes in the front. It is found on all the European coasts. Rocky

coasts they prefer, on which they are abundant during the summer months. At low water they are often found in pairs, concealed in the holes of rocks. Crabs are usually taken in wicker trap-nets, sunk in the sea, and baited with garbage.

The Land, or Violet Crab (*cancer ruricola*) is a singular variety, being found chiefly in the mountains of tropical climates, where it burrows in the ground. About April these crabs, leaving their retreats, assemble in amazing numbers, and proceed towards the sea, where they deposit their spawn; which done, after a short sojourn in the water, they retire again to the mountains. Crabs of this species are common in the Bahama islands, and other parts within the tropics. Though small in size, they are said to be good eating.

The Hermit Crab (*cancer bernhardus*), deserves a passing notice, from its inhabiting a deserted shell which may lie on the sea-shore. One is generally chosen a little larger than is necessary, to allow for its own growth; and, in case of need, it will desert the old shell on finding one larger and more to its liking.

The next in this family to be noticed is the Common Lobster (*cancer gammarus.*) Lobsters, like crabs, are fond of being in the neighbourhood of rocks, and are in consequence scattered around the coasts of Great Britain in great number. On the northern coast they are found in smaller numbers, being more susceptible of cold and stormy weather than crabs. Lobsters change their shells annually, during which process they withdraw for security into holes and crevices of rocks; the new shell soon hardens, when they leave their hiding-places. A female

CRAB AND LOBSTER.

lobster will produce about twelve hundred eggs during the spring and summer, placing them in the sand, where they are soon hatched. The *larvæ* in appearance are not unlike tadpoles. The lobster can run very swiftly, and, when alarmed, will spring, tail foremost, to a distance of thirty feet, repeating these leaps with great rapidity. They often lose their claws. This proves of only temporary inconvenience, since the animal reproduces them in a very short time.

Craw-fish (*cancer astacus*) are found in most European rivers, and are esteemed as food. Their presence is said to be an index to the purity of the waters which they inhabit. Prawns (*palæmon squilla*) inhabit the coasts of England and France. Shrimps (*crangon vulgaris*), inhabit chiefly the sandy coasts of the European ocean. They live in numerous troops, are found near the shore, and swim on the back with great facility. Visitors to Margate need not be told that they are taken in large quantities with a dredging net.

Wood-lice (*onisci*) are the last of the *crustacea* which we can notice. They are well known and very common. Their body is somewhat convex, and furnished with seven pair of short feet. Though possessing fourteen feet, they move but slowly, excepting under excitement. Decayed vegetables serve them for food. The *ova* of the female are enclosed in a pectoral pouch, where also the young are for a time concealed. They defend themselves like the hedgehog, by rolling into a ball-shape. Wood-lice were formerly much used in medicine; even now *these pigs of St. Anthony*, as they are called, constitute,

when boiled in milk, a favourite remedy with some practitioners, who attribute to them diuretic, absorbent, and aperient qualities. To most people, we believe, such a beastly dose would be sure to prove an emetic. None of this family are mentioned in the Bible.

Class III.—ARACHNIDA, OR SPIDERS.

Of the Spider (in Hebrew, *Achkavish;* in English, the Weaver), Job says, "Whose hope shall be cut off, and whose trust shall be a spider's web." In this passage, the Patriarch beautifully compares the hope of the wicked to a spider's web, which, though ever so curious in texture, is so frail, that it is liable to be broken and destroyed by the slightest accident.

Spiders form another extensive family, spread throughout the world, and inhabiting air, earth, and water. In general, though disagreeable, they are innoxious, at least, with few exceptions.

The Common Garden Spider (*aranea diadema*) being so well known, may serve as an example. Like its compeers, it is carnivorous; is furnished with eight eyes and subcircular *maxillæ*, and therefore well fitted as an aggressive warrior. The web which it constructs, shows it to be no less cunning than cruel, and formed for catching its prey. On a wet or dewy morning during summer, every bush and tree in a garden, will be seen covered with these toils, stretched out in a vertical position, between adjacent branches. The first effort of the *architect*

is to form a cable with his spinnerets, and from his own body, of sufficient strength to bear the net which is intended to be hung upon it. After throwing out a floating line, which soon becomes attached to another branch, the spider doubles and redoubles it, testing its strength, not merely by pulling with its feet, but also by swinging upon it with the whole weight of its body. In constructing this geometrical net, the spider uses its limbs as a measure, to regulate the distances of the *radii*, and the circular meshes interwoven into them. They are consequently proportioned to the size of the spider. The net being finished, the marauder usually makes the centre its watch-tower, from whence it may dart down upon whatever prey may chance to get entangled. On the webbed net becoming dirty, it is in a manner useless for the purposes designed: the tenant-spider, in that case, will cleanse it of its impurities; but if this cannot be done, some of the web is broken off by this wary mechanist, rolled up, and thrown away.

The TARANTULA SPIDER (*aranea tarantula*) was formerly much thought of, from a tradition that its bite, which was said to produce madness, might be cured by the sounds of a musical instrument. It inhabits the warmer parts of Europe; forms its nest in the ground, about four inches deep: this apartment is about half an inch in breadth, lined with silk, and closed at the mouth with a net. The female will lay seven hundred eggs in a single season.

The WATER SPIDER (*aranea aquatica*) is another remarkable species, found in most parts of Europe. It lives at the bottom of fresh waters, where it has

the brilliant appearance of silver, from a bubble of air in which it is enclosed. These spiders can seek their prey on dry ground; but whatever food they procure, they retire to their abode in the water to eat it.

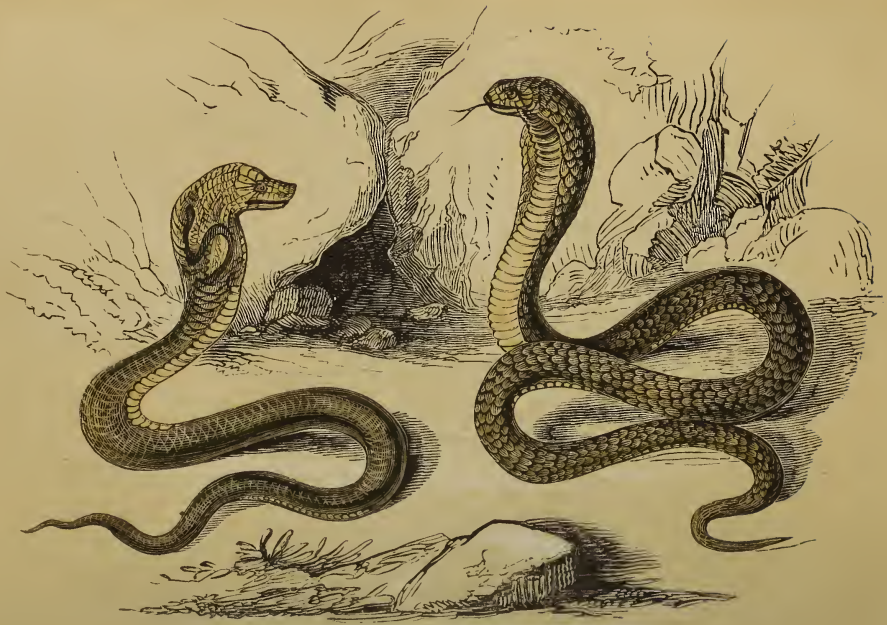
We close our account of this family with the SCORPION, which in Europe is only little more than an inch long, but in India is five times that length; its sting is everywhere severe, and often dangerous. In shape scorpions greatly resemble a lobster, so much so, that the Arabs call them *land-lobsters*. They have two large *palpi*, the ends of which form forceps; the jaws are short, but rounded; the eyes, six or eight in number; the body oblong, and divided into many segments; with a long kind of tail, terminated in an arched sting, and bent over their back. Scorpions live on land, concealing themselves under stones, in old walls, or houses, always shunning the light. They are of a brownish colour. Scorpions are mentioned both in the Old and New Testament.—See Deut. viii. 15; Ezek. ii. 6; Luke x. 19; and Rev. ix. 3. The Hebrew name for the scorpion is AKRAB, which literally signifies,—THE FATHER-KILLER. It is remarkable that both Aristotle and Pliny mention, that scorpions are accustomed to destroy their young, but that one stronger than the rest escapes, and in its turn, becomes the murderer of its parents. This, however, is rather the language of fable than of truth.—(*Pliny, Nat. Hist.* book xi., chap. 25.)

SCORPION AND SPIDER.

Class IV.—INSECTA, or INSECTS.

If one part of the Creator's works be more wonderful than another, it is that of insects, since for diversity of conformation they surpass every other. Many insects are so minute, that the aid of the microscope is indispensable. A machine is the more admirable, and does the greater honour to its inventor, in proportion as it is simple in relation to its destined object, though complex as to the number and variety of its parts. Great and small are but comparative terms. To suppose that insects are produced from *equivocal generation*, is most absurd, and now justly exploded. The body of insects is divided into three parts, the head, the *thorax* or trunk, and the *abdomen* or belly. The *antennæ*, or horns, are of divers forms in different insects. The two upper jaws, similar to strong teeth, are called *mandibles;* the two lower alone, preserving the name of jaws (*maxillæ*.) On the back of these are one or two jointed filaments, called *palpi*. Insects with horny mandibles gnaw; those having the mandibles replaced by minute *setæ*, suck. The legs are attached to the thorax, and vary in number; some have wings also, to the number of four, and attached to the thorax. The wings are sometimes naked and transparent, at other times covered with fine powder. In beetles, the upper wings consist of opaque plates, which open and shut longitudinally, forming coverings to the membraneous wings; in others again, the wing-cases are thinner, but furnished

with ribs. The form and disposition of the wings are much varied. The strong wings of beetles produce a humming sound when they fly. The feet of insects have two joints with *phalanges*, or fingers, at the extremity, varying in number from one to five. The form of the feet varies according to the habits of the insect. Some have the power of prehension in their feet, in others they are compressed, serving as oars. In bees there is a peculiar formation of the leg for carrying away the *pollen* or dust from flowers. In others the feet are very broad, and adapted for digging in the earth. The *abdomen* of insects is composed of from six to nine segments, each divided into two semicircular plates. In some the end of the *abdomen* is armed with a sting. The exterior envelope or skin of insects, which is more or less solid, serves the double purpose of outward protection and internal support. All insects are without a skeleton. The appendages of the skin consist of spines, hairs, and scales, performing important duties in insect economy. The muscles and fluids perform the functions of vitality. The muscles of insects are alike numerous, incitable, and minute. In the caterpillar of one species, Lyonnet reckoned upwards of 4,000 different muscles, while those of the human body do not exceed 529 in number. The nervous system of insects arises from a brain placed in the head, whence originate threads which extend to the other parts of the body. Each *facet* is hexagonal, and may be regarded as a crystalline lens. The eye of a beetle consists of 3,181 such lenses, and that of a butterfly of no less than 17,235. The organ of hearing is not manifest in insects, though most of



them possess that faculty in a greater or less degree. The sense of smelling appears yet more evidently manifested, directing them often to places where their food may be found. The covering of the body being for the most part corneous, the sense of touch is probably feeble. Insects, though destitute of lungs, yet possess the means of producing sounds, and which are generated similar to those produced by a drum, or a stringed instrument. Insects feed on all kinds of matter, vegetable and animal; and most insects have a preference to some particular kind of food. Many also in their perfect state live on food quite different from that on which they subsisted when in a state of *larvæ*. Notwithstanding this, they instinctively deposit their eggs upon the peculiar substances necessary for the food of the young. Many insects subsist but on one kind of food, and are continually eating, whilst those which are carnivorous, are capable of enduring considerable abstinence. Living animals, as well as all kinds of substances, are subject to the attacks of insects for food. The organs of digestion are more or less complicated, according to the habits of the insect, and the nature of the food which it takes. Some insects live in society, and are obliged to provide a supply of provisions during the summer for winter's use; others, as the ants, unite and work in common, not only for their own subsistence, but also for that of their *larvæ*. In insects the sexes are always in different individuals, male and female, to which, in some cases, a third kind occurs, named neuters. Insects, in general, are oviparous; a few ovoviviparous. The fertility of insects is very great, far exceeding that of birds, and only surpassed by

the reproductive powers of fish. A single fly will produce in three months 746,490 flies similar to itself; the silk-worm moth, 500 eggs; and those living in society still more; the female wasp will deposit 30,000 eggs, and the queen-bee from 40,000 to 50,000.

But the most wonderful feature in the history of insects is the transformations which the same individual undergoes during the different stages of its existence. These transformations embrace three states: in the first, the insect has no wings; in the second, the animal falls into a state of apparent lethargy; and, in the third, displays the perfect insect. To this curious subject we shall take occasion again to advert. The duration of insect life in the perfect animal is subject to some variation; but in general, after reproduction, or the laying of their eggs, the insect dies. Some, after this period, live only a few hours; others, a few days or weeks. In superior animals it is almost a general law that life is prolonged in proportion to the length of time at which they attain to puberty; amongst insects it is not so. The *larvæ* of the goat-moth, for instance, require three years to come to maturity; while the cabbage moth becomes a perfect insect in three months; yet they both live equally long. Insects have at birth all the knowledge which they require, and which enables them to perform their respective tasks in the greatest perfection: this for want of a better term we call *instinct*; but in truth, the circle of their actions is marked out for them by a wisdom which is infinite; but so limited, in many cases, is this instinctive faculty, that the slightest deviation

from an ordinary routine will prove their destruction. The migration of insects also, is not referable to the same causes as the migration of birds; but must be attributed chiefly to an excessive multiplication of the species, from causes favourable to reproduction. The geographical limits of the different races of insects, are far from being ascertained. We know indeed, generally, that countries richest in vegetable productions have the largest number of insects. The actual number of insects distributed over the surface of the earth, we have no precise data for ascertaining; but judging from the total number of plants, Messrs. Kirby and Spence, our great entomologists, conjectured that there must be at least, 400,000 distinct species. Of the uses of insects in the economy of nature we have much to learn; yet the individual who can discover no display of wisdom and power in this portion of the Creator's works, must surely have a mind too obtuse to discover any beauty in the most finished productions of the fine arts.

"The wisdom of the Creator," observes Latreille, "never appears with more effect than in the structure of those minute beings which seem to conceal themselves from observation; and Almighty power is never more strikingly exhibited than in the concentration of organs in such an atom. In giving life to this atom, and constructing in dimensions so minute, so many organs, susceptible of different sensations, my admiration of the Supreme Intelligence is much more heightened than by the contemplation of the structure of the most gigantic animals."

A table of the Twelve Orders into which Insects are divided according to the system of BARON CUVIER, and M. LATREILLE.

Order.	Name.	Explanation.	Examples.
1	Myriapoda . .	Insects having more than six feet disposed through the whole length of the body on a series of rings, without wings, but with many jaws	Millepedes, or Hundred-legs.
2	Thysanoura .	Insects having six feet, the belly furnished on the sides with false feet, or appendages for leaping, and without wings or jaws	Podura.
3	Parasita . . .	Parasite insects having six feet, with a sucker, but no jaws or wings	Lice.
4	Suctoria . . .	Insect-suckers with six feet, and a sucker-like mouth, but neither wings or jaws .	Fleas.
5	Coleoptera . .	Insects with six feet, four wings, the two upper case formed, and the lower wings folded, and with jaws . .	Beetles.
6	Orthoptera . .	Insects having six feet, with four straight wings, and jaws	Locusts.
7	Hemiptera . .	Insects having six feet, with four wings, the two upper of unequal consistence, also a sucker, but no jaws; some are without wings . . .	Cochineal Insect. Bed-bug.
8	Neuroptera. .	Insects having six feet, with four equal wings, and jaws	Dragon-flies.
9	Hymenoptera	Insects having six feet, with four unequal wings, and jaws.	Bees, Wasps, and Ants.
10	Lepidoptera .	Insects having six feet, with four powdery wings, also a sucker, but no jaws . . .	Butterflies, and Moths.
11	Rhipiptera .	Insects having six feet, with two wings folded like a fan, also a sucker, but no jaws .	Stylops.
12	Diptera	Insects having six feet, with two membraneous wings, also a sucker, but no jaws.	Gnats, and Flies.

LICE.

In Hebrew, *Kinneem.*—In English, *The Fixers.*

"*He spake, and there came divers sorts of flies, and* LICE *in all their coasts.*"—Psalm cv., 31.

This class of insects might well have been passed over, but for their name occurring in Scripture. They constituted one of the ten plagues inflicted upon the Egyptians, before the exodus of the children of Israel. "The Egyptians," says Mr. Bryant, "affected great external purity, and were very nice both in their persons and clothing; bathing and making ablutions continually. Uncommon care was taken not to harbour any vermin. They were particularly solicitous on this head, thinking it would be a great profanation of the temple which they entered, if any animalcule of this sort was concealed in their garments. The judgments, therefore, inflicted by the hand of Moses were adapted to their prejudices. It was, consequently, not only most noisome to the people in general, but it was no small odium to the most sacred order in Egypt, that they were overrun with these filthy and detestable vermin."

The Flea is likewise noticed by the sacred writers. David says (1 Samuel, xxiv. 14), "*After whom dost thou pursue? after a flea?*" The Hebrew word is *parosh*, which literally means the BACKWARD LEAPER. An Arabian author thus describes this insect: "A black, nimble, extenuated, hunch-backed animal, which, being sensible when any one looks on it, jumps

incessantly, now on one side, now on the other, till it gets out of sight."

ORDER V.—COLEOPTERA.

BEETLES.

In Hebrew, *Chargol.*—In English, *The Lengthened-one.*

"*Even these of them ye may eat, the* BEETLE *after his kind.*" Leviticus, xi., 22.

The Beetle family is one of large extent, and found under different varieties, in every country of the world. It is difficult to assign the precise kind of beetle here referred to. In the Septuagint it is called *ophiomaches,* or the serpent destroyer. Certain it is that the *scarabeus,* or beetle, was accounted a sacred animal by the Egyptians; its figure is still found sculptured even on the sepulchres of their kings. "Nothing," says a late writer, "can be supposed more natural than to imagine that a nation, addicted to polytheism as the Egyptians were, in a country frequently suffering great mischief and scarcity from swarms of devouring insects, should, from a strange sense and fear of evil to come, give sacred worship to the visible authors of these their sufferings, in hopes to render them more propitious for the future." According to Abbé Le Pluche, the beetle, in Egypt, was regarded as the presiding deity of the air.

Amongst so large a family, all interesting, it is difficult to select an example or two. We begin with the May Bug, or Cockchaffer (*Melolontha vul-*

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EARTHWORMS AND SNAIL.

garis), being so well known. This beetle, in common with its compeers, passes through three states. The female lays about sixty eggs, in a deep hole in the earth, and which in about three months become *larvæ*. The grub, or *larva*, lives in the ground for four years, feeding on the roots of plants, and doing great injury to the farmer. In the autumn of the fourth year the grub, burying itself still deeper in the ground, prepares a smooth chamber for itself, and becomes a chrysalis. This state lasts for about three months, when, having gradually changed its colour to reddish-brown, by about January the perfect insect is formed. It appears for a time to be sickly; but in a warm evening of the month of May it issues from the ground. Cockchaffers live but one season; if they escape the many enemies to which they are exposed, the cold kills them at the beginning of winter.

The Hercules Beetle (*scarabæus hercules*), is the largest coleopterous insect of this genus. The maxillæ, or jaws, of this beetle are very long, branched or divided, so as to resemble in some degree the claws of a lobster. They bite most severely. They are natives of South America.

The Lady-Bird (*coccinelia punctata*), is another of this family. These insects are very common; some have red wing-cases, with black or white spots, others with black and red spots. The larvæ of this beautiful little beetle is always deposited on the broad leaves of the dock.

The Glow Worm (*Lampyris noctiluca*), is one of those insects which deserves a passing notice, from the extraordinary light which it emits during sum-

mer evenings, while creeping on the banks or hedges by the roadside. In some localities in the neighbourhood of London these beetles are found in considerable numbers. It is the female chiefly which emits the light, and which she has the power of moderating or prolonging at will. The male glow-worm has wings, but the female is without them. It has, therefore, been concluded that this shining is but the lamp of love, lighted up to guide her errant partner to her.

The last of this class which our limits will permit us to notice is what may properly be called the UNDERTAKER BEETLE (*Necrophorus vespillo.*) It may easily be known, having a long body of a black colour, with two broad bands of yellowish-brown. M. Gleditsch, a foreign naturalist, having often remarked that dead moles, when laid upon the ground, were almost sure to disappear in the course of two or three days, determined to ascertain the cause. He placed a mole upon one of the beds in his garden. It had vanished by the third morning, and, on digging where it had been laid, he found it buried to the depth of three inches, and under it four beetles, which seemed to have been the agents in this singular inhumation. Not perceiving anything particular he buried it again, and on examining it at the end of six days, he found it swarming with maggots, apparently the issue of the beetles, and which M. Gleditsch now naturally concluded had buried the carcase for the food of their future young. In fifty days, this gentleman ascertained, that four beetles had interred four frogs, three small birds, two fishes, one mole, and two grasshoppers, besides the entrails of a fish,

CHAMELEON AND GREEN LIZARD.

COMMON SNAKE AND VIPER.

and two pieces of bullocks' lights. Another naturalist tells us, that in the summer of 1826 he found four of these beetles on Putney-heath, Surrey, hard at work in burying a dead crow. These beetles are by no means uncommon in the mountainous districts of Aberdeenshire.

ORDER VI.—ORTHOPTERA.

LOCUSTS.

In Hebrew, *Arbeh.*—In English, *The Multiplier.*

"*He spake, and the* LOCUSTS *came, and caterpillars, and that without number.*"—Psalm cv., 34.

Locusts (*Gryllus migratorius*), are frequently mentioned in the Old Testament. They often migrate from their native country in immense swarms of several hundred yards square, darkening the air by their numbers. Wherever they settle, an immediate devastation of vegetation follows, destroying the hopes of the husbandman. Bochart thinks that there are no less than ten different kinds mentioned in Scripture. In habits they are all, however, essentially the same. Jackson, in his account of Morocco, tells us that locusts are esteemed a great delicacy, and that at particular seasons they are served up at the principal repasts. They are first boiled in water and then fried. Locusts have occasionally visited our own country.

The Common Grasshopper (*Gryllus viridissimus*), is a member of the locust family, and is found in every meadow during the summer months. Its chirp-

ing is the note of love, the ardour of which is noticed in the desperate fightings which the males have with each other: the female becomes the prize of the victor. Towards the latter end of autumn, the female deposits her eggs in the ground; they remain dormant during the winter, but about May the benign influence of the sun acts upon them, and each egg produces a whitish wingless insect about the size of a flea; its growth is now rapid, and at the expiration of about twenty days the insect throws off its outer skin, and appears a perfect grasshopper. Their lives always end on the setting in of cold weather.

The domestic Cricket (*Gryllus domesticus*), is another member of the locust family.

ORDER VII.—HEMIPTERA.

CIMICES, OR BUGS.

This order of insects, though minute in size, is numerous; some living on land, others in water: some, again, with wings, others without; some undergoing a regular metamorphosis, passing successively through the states of larva, nymph, and perfect insect; others not. That disgusting insect, the Bed Bug (*Cimex lectularius*), first requires a passing notice. It requires no description. The principal remedy against these nightly marauders is extreme attention to cleanliness. Bugs, it is believed, were unknown in this country before the fire of London (1666), when they were brought over in the fir timber employed in rebuilding the metropolis. Besides blood, they will

feed on dried paste, size, or sappy timber. The mother bug lays about fifty eggs at a time, which become alive in three weeks.

The *Conei*, or GARDEN BUGS, are found on plants during fine weather. They become successively metamorphosed, living on insects. The *Gerris* is a WATER BUG, which is found in considerable number during the summer, on the surface of stagnant waters, darting about with considerable agility. The *Nepæ* are also water-bugs, but of larger size. Their fore-feet perform the office of pincers. From the voracity of these creatures, they have been appropriately designated water-scorpions. They mostly remain at the bottom during the day, but take to the wing in the evening.

Another numerous family is the *Aphides*, or PLANT LICE. They are found in immense numbers upon almost all plants. Females, of the same species, are found sometimes winged, others not. At one period of the year they are viviparous, at another oviparous. The young which are born alive die at the end of the season, while those of the eggs are perpetuated. What is still more extraordinary, a female impregnated in autumn is not only fruitful herself, but transmits that influence to her female descendants for a series of generations. Reaumer has proved, that in five generations one *aphis* may be the parent of 5,904,900,000 descendants.

The *Coccus*, or COCHINEAL INSECT, is a remarkable variety. The male alone is winged, and but about half the size of the female. At the period of their amours, these insects fix themselves on a plant, which they never afterwards quit. The male soon dies, but

the female sucks the nutritive fluids of the plant till her body acquires, from the increase of the ova, the form of a gall, including the young; she soon after perishes. These animals are chiefly reared on the *cactus cochinillifer*, or prickly pear; the insects being gathered from the plant several times in a year. The best cochineal, so much esteemed for dyeing scarlet, comes from Mexico.

ORDER VIII.—NEUROPTERA.

LIBELLULÆ, OR DRAGON FLIES.

The beautiful insects called Dragon Flies scarcely require description. They are numerous, and much varied in size; but in their habits they are singularly voracious and cruel, seizing upon any insect they can catch. These insects drop their eggs upon the surface of the water, which, sinking to the bottom, are hatched in the sand, becoming larvæ. In this state, however, they do not remain long, but changing into nymphs or pupæ, they continue in the water for about two years. When the time for the last change has arrived, the pupæ crawl out of the water upon a twig or rush, where they fix themselves. The skin then dries and shrinks, until the insect shakes off its outward skin or case, and expanding its wings, until now confined, flies away, to rejoice, henceforth, in air and sunshine.

The *Ephemera*, or Day Fly, is a singular variety. The larvæ live in the water for a more lengthened period than the last-mentioned insects, some for

THE ALLIGATOR.

three, others for five years, when they pass into the nymph state, in which they remain for about three months, when at length they rise to the surface of the water, and dart away a perfect fly. These insects have well been designated *ephemera*, since some kinds of them live but for three hours, others but a single day, and the most long-lived species only for three days. Having no time for eating, they are not even provided with a mouth, but having deposited their eggs in the water, fall to the ground and die.

The *Termites*, or WHITE ANTS, deserve notice. Insects of this genus are found in India and Africa, and are regarded as the scourge of warm climates. Nothing softer than metals or stones escapes them. They live in numerous communities, either in excavations which they have made in the timber of houses, or in nests erected on the surface of the ground. Their metamorphosis, however, is incomplete. These societies are composed of one male, one female, and numerous workers or neuters, which are always wingless. Some of these last, differing from the others in the form of the head, appear to act as soldiers, or defenders of the community. The nests of those erected on the ground are often twelve feet high above the surface, and perforated by galleries, in which the community reside; the king and queen having an inner apartment to themselves. If the size of these insects be considered, the monuments which they erect are far more wonderful, and five times larger, as compared with human beings, than the boasted pyramids of Egypt. They resemble ants in their laborious industry, but surpass the bee, the wasp, and the beaver, in the art of constructing their

dwellings. One species seems to march in their migrations with all the precision of battalions of soldiers.

ORDER IX.—HYMENOPTERA.

BEES, WASPS, AND ANTS.

The Bee (in Hebrew, *Devbarah;* in English, The Whisperer), from the earliest period must have been known in Palestine, "a land flowing with milk and honey." There are many species of bees, but the honey-bee (*apis mellifica*), is the most useful and remarkable. When a swarm quits the old hive, it is composed of one queen, or female bee, several hundred male, or drone bees, and several thousand working bees, or neuters. Should there happen to be two or more queen-bees, a murderous conflict ensues, the swarm remaining with the victor. In a new hive, they divide themselves into four parties, one of which rove the fields in search of materials, another company begin to lay the foundation of the cells, a third set polish and finish what the others have begun, and a fourth party bring home food for themselves and for those which are labouring in the hive. Things being so far arranged, the queen-bee leaves the hive in the evening on a tour of love, when, meeting with a paramour, she admits him to her embrace; which done, the favoured *swain* soon dies, and the queen returns to the hive in a state of fecundation. She now carefully examines the cells in progress, and begins to lay, depositing one egg only in each cell.

BEES, HORNET, AND WASP.

ANT HILLS.

THE GECHO.

The cells are of three kinds; the first and smallest are for the produce of working bees; the second kind, somewhat larger, for male bees; and a few, three or five, very large, or royal cells, for queen bees only. Several hundred eggs will sometimes be laid in a single day, and which, in from three to six days become alive, in the shape of a small maggot, or *larva*. These are regularly supplied with food by the hive-workers, or *nurses*, with a peculiar substance called bee-bread, which consists of honey, pollen, and a viscous secretion from the bees themselves. When the larvæ are about six days old, the nurses close each cell with wax, and the entombed larvæ begin to entwine themselves in a kind of silken winding-sheet, and become nymphs. At the end of twelve days from their inclosure, breaking their encasement they issue forth in the perfect state of bees: they are now cleaned and preened by the attendant nurses, and then join the out-door workers. The eggs in the male cells are generally about two months later than those of the workers; and the royal cells are not even begun until the queen has made some progress in depositing her eggs in the male cells. The young queens are consequently the last hatched; and when they have passed through the same metamorphoses as the rest, the nurses keep constant watch over them, lest they should be destroyed by the queen-regnant, an act to which she is always inclined. The entire laying of eggs and breeding, are quite completed by the time of autumn. In the event of a hive being deprived of their queen by accident, the workers have the capability of producing another. This is done in the

following extraordinary manner: the cells are examined for the larvæ of workers, which are not more than three days old; on finding such, they immediately enlarge the cells of these larvæ, feeding them with female, or *royal jelly*, until, by dint of care and labour, a female is produced which is to replace the one they had lost. Besides the cells made for rearing the young, others are made, of the same materials and shape, for depositing the honey which may be brought into the hive, and which is destined for their use when no honey can be gathered. The cells or honey-combs are so arranged in layers that ready access can be obtained to them. On the weather becoming cold, not only are the larvæ and nymphs destroyed, but the male bees also. Having no stings, like the workers and females, they are easily massacred, or driven out of the hive, and so perish by the cold. During the winter months the whole hive appears to be in a state of half-lethargy.

The Hornet (*vespa crabo*) subsists by rapine and destruction; the sting serving as an offensive weapon. Hornets usually construct their nests in the trunks of decayed trees. The females, in the spring, having passed the winter in a lethargic state, become reanimated by the return of warm weather. In building their nest they first construct a solid pillar formed from the bark of the ash, to which the whole nest, made of the same material, is attached. No sooner is the nest finished, than the female, probably fecundated previously to the winter, begins to lay. The young undergo metamorphoses similar to those of bees. By the commencement of autumn

the young, females and males, have come forth from their nymph state. About October the remaining larvæ are plucked out of the cells, and flung out of the nest; the males and workers gradually perishing from cold, so that by the end of winter, only a few females remain at the bottom of the nest. Such is the miserable finish of this society, consisting of from a hundred to a hundred and fifty individuals. See Exodus xxiii., 28.

The internal economy of the COMMON WASP, (*vespa vulgaris*) does not essentially differ from that of the hornet.

The COMMON ANTS (*formica nigra*) live in society like bees and wasps, the community consisting of males, females, and workers; the latter always without wings. The workers are exclusively employed in constructing the abode, feeding and protecting the young, and in retaining the females after impregnation. The males are much smaller than the females; and after the purpose of nature is secured, return no more to their accustomed dwelling. The females, on the contrary, return to deposit their *ova*, having first lost their wings. The *larvæ*, on becoming *pupæ*, are for the most part enclosed in *cocoons;* when the insects become perfect, those with wings are retained in the nest, till the weather be favourable for their flight and fecundation. The habitation or nest is constructed with different roads or galleries, leading to a central cavity, the chief abode of the family. Fruits, insects, or carrion, form the food of ants. The different species of ants always keep distinct; but in their general economy are similar.

BUTTERFLIES AND MOTHS.

"*He gave also their increase unto the* CATERPILLAR."—PSALM lxxviii., 46. "*Which are crushed before the* MOTH?"—JOB iv., 19.

THE CATERPILLAR, known by the name of the *silk worm*, having fed upon the leaves of the mulberry tree for about six weeks, begins to envelop itself with minute yellow silken threads, till it has formed a case or ball, called a *cocoon*, about the size of a pigeon's egg; it now changes to a *chrysalis*. In this state it remains for fifteen days, when the perfect insect appears, and which will gnaw its way out if left to itself. The *cocoons*, therefore, are exposed to such a degree of heat as to kill the inclosed animals, a few only being saved to keep up the breed. The moth when produced is but very short-lived, breeding soon after its exclusion, and perishing when the purpose of nature is fulfilled by the deposition of eggs for future races. Each *cocoon* will produce on the average, a double silken thread of 400 yards long. Henry II. king of France, is said to be the first who wore silk stockings in that country; Queen Elizabeth in England.

Of butterflies and moths, who all undergo the like transformations, there are almost an infinite variety; some flying by day, others by night. The tortoise-shell butterfly (*papilio urticæ*) and the cabbage white butterfly (*pontia brassicæ*) are the most common in this country.

The moth referred to by the sacred writer and

quoted at the beginning of this article, is no doubt, of the genus *tinea*. Insects of this kind are particularly destructive to woollen cloths and furs, the female depositing her eggs upon them, and which become caterpillars in fifteen days. In the spring they change into *pupæ*, and after about twenty days become moths. The ravages of these insects are very great, the caterpillars perforating and eating the substances on which they have been deposited.

On the eleventh order of insects, RHIPIPTERA, there is nothing particular to remark.

ORDER XII.—DIPTERA.

GNATS AND FLIES.

ALTHOUGH the word GNAT does not occur in the Hebrew scriptures, yet it is noticed by our Saviour in his memorable reproof to the Pharisees, for affecting to be very scrupulous in little things, while disregarding those of the greatest moment:—"*Ye blind guides, which strain at a* GNAT, *and swallow a camel.*"—Matthew xxiii., 24. Gnats form an extensive and troublesome race. Even the COMMON GNAT (*culex pipiens*) is far from an agreeable companion. All of this family undergo a complete metamorphosis, but modified in two principal ways; some forming a *cocoon*, while in others the skin of the *larvæ* hardening, becomes a solid covering, of an oval form, like an egg, and presenting no exterior marks of the contained animal. Many of the smaller species, especially in damp localities, assem-

ble in numerous troops, and form airy dances while flying. The female gnat deposits her eggs in the water; each brood amounting from two hundred and fifty to three hundred and fifty. The larvæ of gnats always swarm in spring and summer.

Flies form a most extensive family, and are every where to be found. They formed one of the plagues of Egypt.—See Exodus viii., 20. Common Flies (*musca domestica*), of most insects, are best known. They are exceedingly troublesome to man and beast, sharing in all our viands and sweets. Different species of flies choose various substances on which to deposit their eggs, according to the wants of the coming larvæ. Those found in cheese have the singular faculty of leaping to a considerable distance; others give birth to living larvæ: the female gad-fly (*æstrus equi*) deposits her eggs on the nostrils, legs, or shoulders of horses, which, on being licked, are conveyed into the stomach.

DIVISION IV.

RADIATA, OR ZOOPHYTES.

The class of creatures on which we are now to treat, forms the connecting link between the animal and vegetable world, and may be pronounced the lowest in the scale of beings. Their forms are of the most simple kind. The several classes do indeed vary considerably; yet they all show traces, more or less distinct, of a radiation from a common centre. The Radiata include five classes: (1,) the *Echinoder-*

mata, or Sea Urchins; (2,) *Entozoa*, or Intestinal Worms; (3,) *Acalaphæ*, or Sea Nettles; (4,) *Polypi*, or Fixed Sea-Nettles; (5,) *Infusoria*, or Microscopic Animals; the details of the organization of some of the last-named class, even escaping the deepest powers of the microscope.

Animals of the first class, or Sea Urchins, form a very numerous family, widely scattered in all seas. They have neither head, eyes, or articulated feet; their nervous system is likewise very obscure; and their organs of motion extremely imperfect. They possess the singular faculty of reproducing parts of their bodies which may be broken or separated by accident. Some of them are round and covered with spires, like hedge-hogs; other assume a radiated shape, and are called Star-Fish.

The second class consists of Intestinal Worms, remarkable for existing and propagating only in the interior of other animals. These disgusting creatures have a soft and elongated body, but without head, eyes, or feet; the mouth is formed of one or more suckers. The *tænia*, or tape worm, infesting the human body, has a flattened long body, commonly about twenty feet in length: it has been found to exceed a hundred.

Sea Nettles form the third class, having a gelatinous, circular, and radiated body, with a soft and transparent skin, susceptible of contraction and dilatation. From the softness of their bodies, they are commonly known by the name of *jelly-fish*. The mouth, or sucker, is in their centre. They are all marine, and emit during the night a phosphoric light. Many species are ornamented with lively colours.

The Polypi, or *Fixed Sea-Nettles*, form one of the largest and most singular classes of the animal kingdom. At the lowest scale amongst animals, most of them have the form of plants, yet capable of reproduction. They are destitute of head, eyes, circulation, respiration, or locomotion; though all furnished with a stomach and powers of digestion. Many of the *polypi* have the principle of life so diffused in their simple structure, that portions cut from an individual soon acquire, in the proper element, all the characters of a perfect animal. It is also most remarkable, that many of this class, besides possessing their own individuality, form also compound animals, adhering one to another by lateral appendages. Some extend their race by buds, in the manner of plants; others, by means of eggs. In warm countries, *polypi* multiply with such facility, and in such great abundance, as to become powerful agents in the formation of islands, and the extension of sea-coasts.

Coral and Sponges, if not *polypi* themselves, must be referred to *polypi-architecture*. Coral grows in the sea, at very considerable depths; and requires at least ten years to bring it to perfection. The *polypi* which inhabit the cellules of the surface of the coral, are very soft, white, and not very transparent. Little is known of the precise manner of their propagation.

Sponges are organized bodies, without any regular determinate form, presenting an absorbent surface, having some obscure traces of feeling. They are always found adhering to rocks, or submarine bodies, and at considerable depths. Sponges are very common in the seas of warmer climates, attaining to

SHITTIM WOOD.

very large dimensions; but decrease in size in more temperate regions. The interior of sponges is corneous and fibrous, forming a sort of felt-like tissue, more or less compact. It is this which attaches the sponge to submarine bodies; the exterior is soft, or gelatinous, forming a sort of general stratum, which is the seat of sensibility.

The fifth class, denominated INFUSORIA, designates a kind of animals which are developed in vegetable and animal infusions. From their extreme minuteness, they require the aid of a microscope to bring them within the sphere of our observation. Some of these *animalculæ* appear to have a regularly developed organization; others a form evidently radiated; others are vermiform; and others again, *amorphous*, or without any definable shape.

DIVISION V.

TREES, PLANTS, AND FLOWERS.

I.—CHESNUT, OAK, ELM AND ASH TREES.

THE CHESNUT (*castanea*) is valuable, since its wood, if kept dry, is extremely durable, and is rapid in its growth. The celebrated chesnut at Tortworth, Gloucestershire, is believed to be at least a thousand years old; and in circumference fifty-two feet. The fruit of the esculent chesnut forms an important article of commerce. Deer and hogs are very fond of chesnuts, and fatten well upon them.

The OAK (*quercus ballota,*) was doubtless found in Palestine. The oak, as most know, ranks among

the largest, the most durable, and useful of forest trees.

The Elm (*ulnus campestris*) is only once mentioned in Scripture, Hosea iv. 13. The wood of this beautiful tree is hard, tough, and impervious to moisture; and hence much used in commerce. The elm affords subsistence to a variety of insects; its leaves are eaten by silk worms with avidity: cattle also relish them for food.

Of the Ash (*fraxinus*) there are many varieties. The leaves of the ash appear late, and fall early, and are considered good fodder for cattle. The timber of the ash ranks next in value to the oak, being hard and tough.

II.—MYRTLE, BOX, AND BAY TREES.

The Myrtle (*myrtus communis*) is a beautiful shrub, common in Judea. It sends out a great number of small flexible branches, with soft smooth shining leaves, of a beautiful green, and of sweet smell. The flowers, which are white, grow among the leaves, and have an agreeable perfume. This shrub is referred to in Scripture for its beauty and fragrancy. See Isaiah xli. 19; Zechariah i. 8—10.

Of the Box Tree (*buxus*) there are three varieties. The wood of this tree is valuable from its colour and hardness, being of a beautiful white colour, and receiving a fine polish. Many articles of turnery are made of it.

The Bay-Tree (*laurus nobilis*) is mentioned, Psalm xxxvii. 35, 36. It grows with an upright trunk, branching out on every side. The dark green leaves of this tree afford a useful oil, employed in

MYRTLE, BAY, AND BOX.

medicine. The bitter berries of the bay-tree also yield an essential oil.

III.—THE PALM TREE.

The Palm-tree (*phœnix dactylifera*), was always greatly esteemed among the Israelites, being much cultivated in Judea, so that in after times it became the emblem of that country. Medals of the emperor Vespasian may still be seen, which were struck to commemorate the conquest of Judea, bearing the head of Vespasian on the one side, and on the reverse a captive woman sitting under a palm tree, with the inscription, Judea Capta. The neighbourhood of Jericho, in particular, was distinguished for its palm trees, Moses calling Jericho, (Deut. xxxiv. 3,) *"the city of palm trees."* Dates, the fruit of the palm, are, perhaps, the most nutritious edible substance in existence. The inhabitants of Barbary, in travelling, consider themselves well supplied with provision if they have but a bag of dates and a bottle of water.

IV.—THE CYPRESS, CEDAR, AND PINE TREES.

Gopher Wood (*cupressus sempivirens*), Gen. vi. 14, is believed to be the Cypress. The common, upright cypress, though a native of warm climates, has long since been transferred to our gardens, for the beauty of its evergreen branches. Its timber is of great durability. In Assyria, especially about Babylon, cypress trees still greatly abound.

The Cedar (*cedrus Libani conifera*), is a noble evergreen tree, frequently mentioned in Scripture.

Its lofty height, and far-extended branches, afford a spacious shelter and shade. Ezekiel xxxi. 3–8. The wood of the cedar is very valuable, of a reddish colour, an aromatic smell, and reputedly incorruptible. The ark of the covenant, and much of the temple of Solomon, was built of it. The tree is called *"the glory of Lebanon,"* Isaiah, lx. 13; and in former times greatly flourished upon that mountain. Dr. Richardson, who lately visited the spot, is of opinion, that on the mountain of Lebanon there cannot now be less than three hundred cedars.

The Aleppo Pine (*pinus halepensis*), seems to have the best claim as being the *pine* mentioned in the Bible. Its trunk is slender and erect, with long bright-green leaves.

V.—THE VINE AND FIG TREE.

If the forest trees of Judea were fine, we may be sure that the fruit trees also would be of the choicest kind. The Vine (*vitis vinifera*), is a noble plant of the creeping kind, and famous for its fruit. Moses distinguished the true vine from other genera, by calling it (Numbers, vi. 4,) the *vine tree*, literally the *vine of the wine*. Of the fineness of the vineyards, and excellence of the grapes, of Palestine, many proofs might be given. The grapes which were cut in the valley of Eschol by the spies sent by Joshua, and borne upon a staff between two men, were of surpassing beauty and size.

The Fig Tree (*ficus carica*.) Figs, like grapes, were abundant in the Holy Land. Fig trees there become large, dividing into many branches, and producing a pleasant shade by their large leaves.

FIGS AND GRAPES.

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PISTACHIO NUT AND JUNIPER.

VI.—EBONY AND THYINE WOOD.

Ebony (*ebeni ligna*), is an Indian wood, of a black colour, and great value. It is very hard, and admits of a fine polish. The word only occurs in Ezek. xxvii. 15, where it is mentioned among imported articles.

The Thya is a large tree, well known in the East, and not unlike the cypress. It was employed for the roofs of houses and the ceilings of rooms, having a fragrant smell. It is impenetrable to the worm, and never rots. See Rev. xviii. 12.

VII.—THE JUNIPER AND PISTACHIA-NUT TREES.

The Juniper Tree (*juniperus communis*) seldom obtains a height of more than fifteen feet, and may therefore rather be called a shrub than a tree. Juniper berries possess a strong unpleasant smell, and a warm, sweet, and pungent taste. The resin of this tree is the gum *sandarach* of commerce. See I. Kings, xix. 4, 5.

The Pistachia Tree (*pistacia terebinthus*) is a native of Syria and Arabia, growing to the height of twenty-five or thirty feet, and is cultivated for its fruit. Pistachia-nuts have an unctuous pleasant taste, and are reputedly wholesome and nutritive.

VIII.—THE MULBERRY TREE.

The White Mulberry (*morus alba*) is much cultivated for its mucilaginous leaves, that afford a most grateful food to silk-worms. The fruit has a pleasant taste, and is much used in medicine for gargles. See II. Samuel, v. 23.

IX.—APPLE TREES—ORANGE AND CITRON TREES.

THERE is reason to believe that Solomon, in the Canticles, refers to orange, citron, or pomegranate trees, rather than to apple trees. These trees grow in Judea in great numbers, though apple trees are scarcely known. Citron trees are described as noble in appearance, being large, their leaves beautiful, and ever continuing on the tree, of an exquisite smell, and affording a most delightful shade. The orange tree, in warm climates, is a beautiful tree both for its shade and fruit. The same remark is applicable to the pomegranate tree. Canticles, vii. 8; I. Samuel, xiv. 2.

X.—THE SYCAMORE AND ALMUG TREES.

THE SYCAMORE (*ficus sycomorus*) is a large spreading and evergreen tree, often shooting up to a considerable height. Sycamores are common in Palestine and Arabia, being highly esteemed alike for their wood and fruit. Mummy chests, made of this wood, have been found in catacombs uncorrupted after a period of three thousand years. The fruit has the figure and smell of figs. Luke, xix. 4.

The ALMUG TREE (*pinus orientalis*) is described by the Jewish historian, Josephus, as a species of pine, and as having been brought in ships from Ophir, for the construction of Solomon's temple. The timber of this tree is large, fine, and durable.

XI.—THE WILLOW AND POPLAR TREES.

THE species of WILLOW referred to in the Bible, is

ORANGES AND POMEGRANATE.

1. MYRRH.—2. CAMPHOR.—3. FRANKINCENSE.—4. BALSAM.

probably the *salix babylonica*, being like all its compeers small in size, and fond of low and wet situations. To this tree the Psalmist beautifully refers, Psalm i., 3.

Few trees are better known than the POPLAR (*populus alba*); the whiteness of its leaves, bark, and wood, being such characteristic marks, that none but *Cockneys* can mistake it. See Genesis xxx., 37; Hosea iv., 13.

XII.—MYRRH, CAMPHIRE, BALSAM, AND FRANKINCENSE.

MYRRH is a valuable gum which issues, by incision, from the trunk of the *balsamedendron gileadense*. Its taste is extremely bitter, but its smell not disagreeable. Among the ancients it entered into the composition of their most costly ointments. Myrrh formed a component part of the holy anointing oil, used for sacred purposes. See Exodus, xxx., 23.

The CAMPHIRE (*lawsonia inermis*) is one of those plants which is grateful alike to the eye, and to the smell. The leaves are light green, and the flowers collected into long clusters like the lilac, are white and yellow. Its odour is most delicious. The powder of the leaves is much used by females in the East, for giving an orange tincture to their nails. Canticles, i. 14; iv. 13.

The BALSAM-TREE (*amyris Gileadensis*) is an evergreen shrub, which grows about fourteen feet high, and in its native country, without culture. The resin of this tree is the true balm of Gilead, so beautifully referred to by the prophet, Jeremiah, viii. 22. Balm is chiefly obtained by incision. It

has a bitter aromatic taste, and a highly fragrant smell. As a specific for almost every disorder, the balm of Gilead was held in high reputation. Balsam-trees are still found in the plains of Jericho.

Frankincense is a dry resinous substance, of a yellowish-white colour, a strong fragrant smell, and a bitter, acrid taste. The region from which it was brought, is said in Scripture to be Sheba; Isaiah lx. 6, and Jeremiah vi. 20. The tree (*boswellia thurifera*) is a native of India.

XIII.—WORMWOOD, HEMLOCK, AND MANDRAKE.

Wormwood, or Southernwood, (*artimisia maritima*) is referred to in Scripture, Deut. xxix. 18, for its extreme bitterness. It formerly possessed some reputation as a medicine.

Hemlock (*conium maculatum*) is a biennial plant, growing without culture, and flowering in the months of June and July. Though the whole plant is poisonous, yet the leaves are much used in medicine: they possess a faint disagreeable smell, and a bitter nauseous taste. Hosea x. 4; Amos vi. 12.

Great variety of opinions exist as to the meaning of the word Mandrake; in the Hebrew, *dudaim.* Perhaps we cannot do better than follow Hasselquist, who travelled to the Holy Land to make discoveries in natural history. Speaking of Nazareth in Galilee, he says, "What I found most remarkable at this village was, the great number of mandrakes, which grew in a vale blow it. The fruit ripens in May, and is a species of melon." See Genesis xxx. 14—17 inclusive.

1. HEMLOCK.—2. MANDRAKE.—3. WORMWOOD.

SWEET CANE AND CINNAMON.

THISTLE, BRAMBLE, AND THORNS.

XIV—CINNAMON AND SWEET-CANE.

Cinnamon is the bark of the true cinnamon-tree (*laurus cinnamomum*), and is one of the most agreeable and useful aromatics. The tree is of small size, not exceeding the height of the willow; it is far from uncommon in the East Indies. See Exodus xxx. 23.

The Sweet-Cane referred to by the prophet, Jeremiah vi. 20, is the *calamus aromaticus* of India and Arabia. While growing, it scents the air with its fragrancy; and when dried and powdered, forms an ingredient in the richest perfumes.

XV.—THORNS, THISTLES, BRIERS, AND BRAMBLES.

Thorns and Thistles are first mentioned in Genesis iii. 18, and probably the names refer to deleterious plants in general, rather than to any particular species. Thistles are indigenous in all countries; and very troublesome to the farmer.

The Bramble (*rubus fruticosus*) is a species of buckthorn, which is a native of Syria and Palestine. Many of the buckthorn family are remarkable for the length and abundance of their spines. These plants are of quick growth. The crown of thorns, which was put upon the head of our Saviour, was made from a tree of this species.

XVI.—CORIANDER, ANISE, AND HYSSOP.

Coriander (*coriandum sativum*) is a strongly aromatic annual plant, bearing a small round seed, of an agreeable smell and taste.

The Anise (*anisum*) is an annual umbelliferous

plant, the seeds of which have an aromatic smell, a pleasant warm taste, and a carminative quality. See Matthew xxiii. 23.

The Hyssop (*hyssopus officinalis*) has a bushy stalk, growing about two feet high; its leaves are small and spear-shaped; the flowers, which terminate by erect, whorled spikes, are of different colours, according to the species; their smell aromatic, and their taste warm, but bitter. Under the law, the hyssop was commonly used in purifications for sprinkling. See Psalm li. 7.

XVII.—RUE AND MINT.

The word Rue (*ruta chalepensis*) occurs in the Scriptures once only, Luke xi. 42. It is a small shrubby plant, common in gardens, and having a strong, unpleasant smell, with a bitterish penetrating taste.

Mint (*mentha*) is mentioned in the New Testament, Matthew xxiii. 23. It is a well-known garden herb.

XVIII.—LENTILS AND TARES.

Lentils (*cicer lens*) are a sort of pulse, and much esteemed for food: they grow abundantly in Egypt. On being boiled, they dissolve into a mass, making a pottage of a chocolate-colour. This was probably the red pottage mentioned in the book of Genesis, chap. xxv. v. 34.

Tares (*zizarion,*) mentioned by Saint Matthew, chap. xiii. v. 25, cannot be identical with the tares of our own country. On the contrary, the *zizarion* is a poisonous plant, which grows among corn, and is well known in the East.

RUE AND MINT.

FLAX AND MUSTARD.

XIX.—FLAX AND MUSTARD.

Few plants are better known than Flax; or more useful, alike for its seed and fibre. It grows luxuriantly on ground newly broken up; flowering in July. Linseed has become a most useful article in commerce, from the immense quantity of oil impressed from it. Flax, steeped for a time in water, becomes fit for the manufacture of linen. See Exodus ix. 31.

The Mustard-Seed (*sinapis*,) referred to by our Saviour, Matthew xiii. 31, as becoming a tree, must not be estimated by the growth of plants in our country. There is a species of mustard in the East, which grows to the height of several feet.

XX.—ONIONS, GARLIC, AND LEEKS.

Onions (*allium cepa*) are well-known garden plants, with a bulbous root. Numbers xi. 5.

Garlic, from its being coupled with leeks and onions, must be the root known by that name.

The Leek (*allium porrum*) is of the same nature with the onion. It is cultivated, and much esteemed in Egypt.

XXI.—GOURD, CUCUMBER, AND MELON.

The Gourd was doubtless some climbing plant, with large leaves, and of quick growth. If the words of Scripture—"*which came up in a night, and perished in a night*," are to be literally understood, it could only have been produced by a direct divine interposition. Jonah iv., 6, 7, 9, 10.

The Cucumber (*cucumis sativus*) is so common

as to require no description. Cucumbers are very plentiful in the East, of good flavour and much eaten. Numbers xi. 5.

The Melon (*cucumis sativa*) requires no description. In eastern countries it grows to great perfection; the juice being particularly cooling and agreeable. Of this fruit there are many varieties. "The inhabitants of Mount Carmel," observe the travellers Egmont and Heyman, "chiefly employ themselves in improving their gardens, where they have, among other fruits, *excellent melons*, which, in goodness and taste, are not at all inferior to those of Naples and the West Indies."

XXII.—CUMMIN, OLIVES, AND SAFFRON.

Cummin (*cumminimum*) is an umbelliferous plant, resembling fennel. Its seeds are aromatic, but of a bitterish taste. See Isaiah xxviii. 25.

The Olive-Tree (*olea Europœa*) is often mentioned in Scripture. This tree is of moderate height; thriving best in a sunny and warm situation. Its trunk is knotty; its bark smooth, and of an ash-colour. The leaves are of a dark green on the upper side, and whitish below. The tree flowers in June. The olive is indigenous in Judea. The Jews, besides using olives as a fruit, procured from them large quantites of oil: this was used both for common and sacred purposes. It also became an article of exportation.

Saffron (*carthamus tinctorius*) is an exotic plant, which grows from a bulbous root. The stalk bears a blue flower, and on the flower are three small golden threads, which is saffron.

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HEATH AND GRASSES.

XXIII.—ALOES.

The Aloe (*aloe succotrina*) is a plant with broad thick leaves. It grows about two feet high. A very bitter gum is extracted from it, which is used in medicine, and anciently for embalming the dead also. Nicodemus is said, (John xix. 39,) to have brought one hundred pounds weight of myrrh and aloes, to embalm the body of Jesus.

The Lign Aloe (*agallochum præstantissimum*) is a small tree, about eight or ten feet high. The top of it has a large bunch of leaves, which are indented; broad at the bottom, but growing narrower towards the point, and about four feet in length. The blossoms are red, intermixed with yellow, and double, like a pink. The seeds which follow, are oblong and triangular. The flower and seeds emit an effluvium, which perfumes the air all around.

XXIV.—THE LILY.

The Lily referred to, Matthew vi. 28—30, is not the lily of the valley, Canticles ii. 2; but the *Amaryllis lutea*, the golden flowers of which afford one of the most brilliant gorgeous objects in nature. This flower is everywhere common in the Levant. The Emperor Moth adorns our engraving of this flower.

XXV.—GRASSES AND HEATHS.

Grass, or *herbage*, is the well known vegetable on which cattle feed, and so remarkable for its transitory duration. Genesis i. 11; Psalm xc. 6. The varieties of this plant are most numerous.

The Heath of Scripture, Jeremiah xvii. 6, must

be referred to the *lichens*, a species of plants, which is the last production of vegetation under the frozen zone, and under the glowing heat of equatorial deserts. Its numbers are countless.

XXVI.—BARLEY, WHEAT, AND RYE.

PLINY, in his *Natural History*, asserts that BARLEY (*hordeum*) is the most ancient aliment of mankind. Barley, in Palestine, is sown about October, and reaped soon after Passover, that is, in March. See Exodus xi. 31.

WHEAT (*triticum compositum*) is the principal and most valuable kind of grain for the service of man. Genesis xxx. 14.

RYE (*triticum spelta*) is a well-known plant, in common cultivation, bearing naked seeds, on a flat ear, furnished with awns, like barley. See Exodus ix. 32.

Thus, COURTEOUS READER, have we conducted you through the flowery paths of SCRIPTURE NATURAL HISTORY; and if you have derived as much pleasure in reading these sketches from the BOOK OF NATURE, as we have in writing them, you will have no reason to regret the time and labour which you have bestowed upon them. And if, moreover, we may have induced you to turn over the pages of ETERNAL TRUTH, in connexion with these Volumes, we shall have conferred no small benefit upon you.

THE END.

BARLEY, WHEAT, AND RYE.